ELECTRICAL WEST

5-5-43

THE ALL-INDUSTRY MAGAZINE OF PROGRESS

MAY 1 - 1943

Durham, N. C.

McGr[illegible]-Hill Co.
of [illegible]ifornia

MARCH, 1943

25c a Copy

There's a wonderful
All-Electric future
in store for you!
It's coming
The age of better, electrical living!
PLAY SAFE, KITE FLYERS...
Put "Adequate Wiring" In Your Plans For Tomorrow
If this happens now in your house
Plan to Have Adequate Wiring After the War!
A REMINDER
Your housework will be a "snap" tomorrow!
Southern California Edison Company Ltd
Getting Ready
for a new way of Life?
Edison

Sowing the seeds for Future Sales

In peacetime, Southern California was one of the nation's richest markets for electrical appliances . . . and will be again after the war. In preparation for the time when new appliances again are available, the Edison Company is cultivating this market by means of continuous consumer advertising such as that shown here. Electrical dealers in Edison territory will reap the harvest of sales.

SOUTHERN CALIFORNIA EDISON COMPANY LTD.

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), March, 1943. Vol. 90, No. 3. Published monthly by the McGraw-Hill Company of California, 68 Post Street, San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rate in U. S. and U. S. possessions, and Canada, $2 per year; all other countries $3 gold (thirteen shillings). Single copy 25c.
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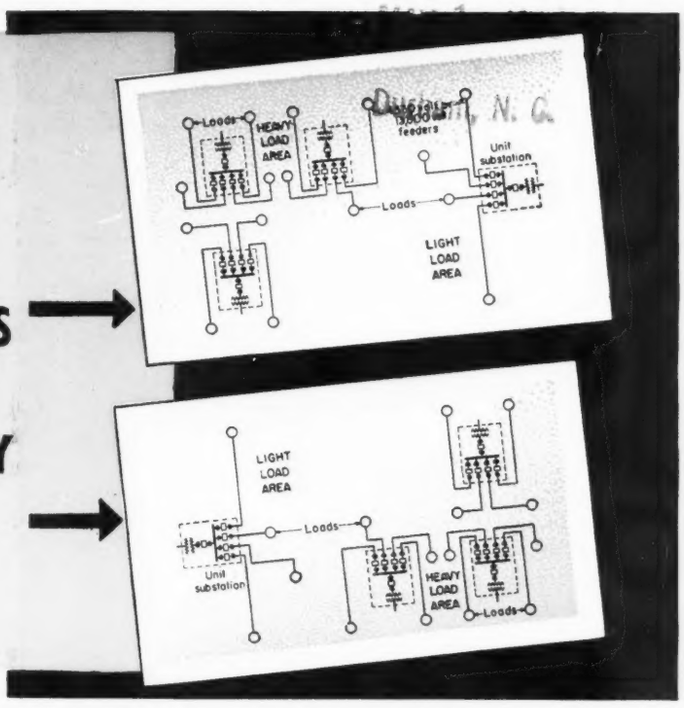
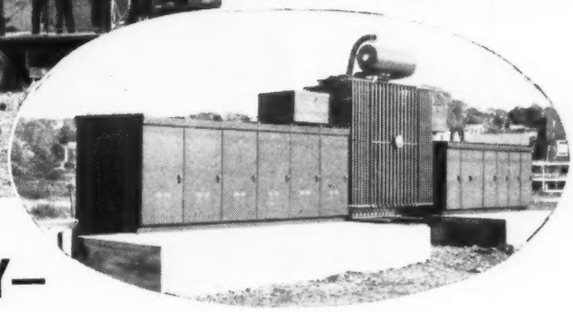
TO SUPPLY
QUICKLY NEW LOADS →

---THAT ARE LIKELY
TO SHIFT →



Install UNIT SUBSTATIONS

Even large unit substations like this (3000 kva) are shipped in completely assembled sections. Skid them into position, bolt them together, make the necessary connections—and the unit substation is ready for service.



YOU CAN INSTALL THEM QUICKLY—
AND MOVE THEM EASILY IF THE LOAD SHIFTS

YOU can order and install G-E unit substations in a fraction of the time required for old-style, "piecemeal" substations. They are delivered in compact, completely assembled sections. By locating them right at load centers, you shorten secondary runs, save vital copper, and reduce losses.

What's more, if the load shifts, the easy-to-handle sections make it easy to move a unit substation to the new load center, whether it be yards or miles away.

Installed, a unit substation is a single, coordinated, safety-enclosed unit that functions more dependably and gives extra protection to personnel. Designed for outdoor service—and with a pleasing appearance—they make large investments in real estate and buildings unnecessary.

From every angle, *unit* substations are the practical, far-sighted answer to the changing power requirements of today and tomorrow. A new, attractive 36-page bulletin contains complete, useful information. You can get a copy from your local G-E office, or by writing General Electric Co., Schenectady, N. Y.

GENERAL ELECTRIC

302-16-5900

Here in the WEST

People

L. N. McClellan

who writes of a new Bureau of Reclamation project (p. 35) is chief electrical engineer for the USBR at Denver. Following graduation from the University of Southern California in 1911, he went to work for the bureau as junior engineer on the Salt River project in Arizona. From December 1917 to December 1918, he was in the Army tank corps holding the commission of first lieutenant. Following the war he rejoined the Bureau of Reclamation at Denver as assistant engineer and in 1923, he went to Southern California Edison Co., where for one year he was engineer in the transmission department. He has held his present position since December 1924.

Earl Baughn

author of the article on wartime transformer loading (p. 38) has been in the engineering department of Washington Water Power Co. for 20 years. He was born in Nebraska and received his engineering training at the State College of Washington at Pullman. For a short time after graduation, he worked in the General Electric Co. testing department and for five years he was in the Navy Department, Washington, D. C., and the Mare Island Navy Yard. Following this he joined the utility.

Preview

It Will Be Different

Anyone who thinks that life will return to the even tenor of pre-1939 once the war is over, is simply kidding himself. Things will be different, and the time to begin thinking about the possible changes is now. With that aim, the Planning Committee of the PCEA has drafted a report to the industry, setting up a skeleton postwar planning schedule. It's provocative. It's stimulating. And it applies to anyone in the industry or to any of its branches. The report will be the feature article in the April issue.

Welding

One of the greatest industrial contributions to the high rate of war production is welding, in all its various applications and techniques. Each year new strides are made in this art. How welding speeds construction and reduces costs in the erection of a hydroelectric project will be described in an article in the April issue. This particular paper was one of the prize winners in last year's Jame F. Lincoln Arc Welding Foundation contest.

Pages

Employee Participation in Management 33
By Alfred M. Cooper—Conference discussion of company policy by entire staff would include all employees in the new coalition of labor and management.

Power for the Southwest 35
By L. N. McClellan—New Bureau of Reclamation hydroelectric plant adds to supply for war industries.

Merchandising Methods Net Bond Sales 43
Campaign technique sells War Bonds to 97.7% of Los Angeles Department of Water and Power employees.

War Advances Cold Cathode Linear Lighting .. 54
Industrial applications in Northwest follow satisfactory experience with interior lighting of offices and business quarters.

New Products 4
Bulletins 28
Electra 30
Engineering 35
Sales 43
Rural 51
Lighting and Wiring 54
Associations 61
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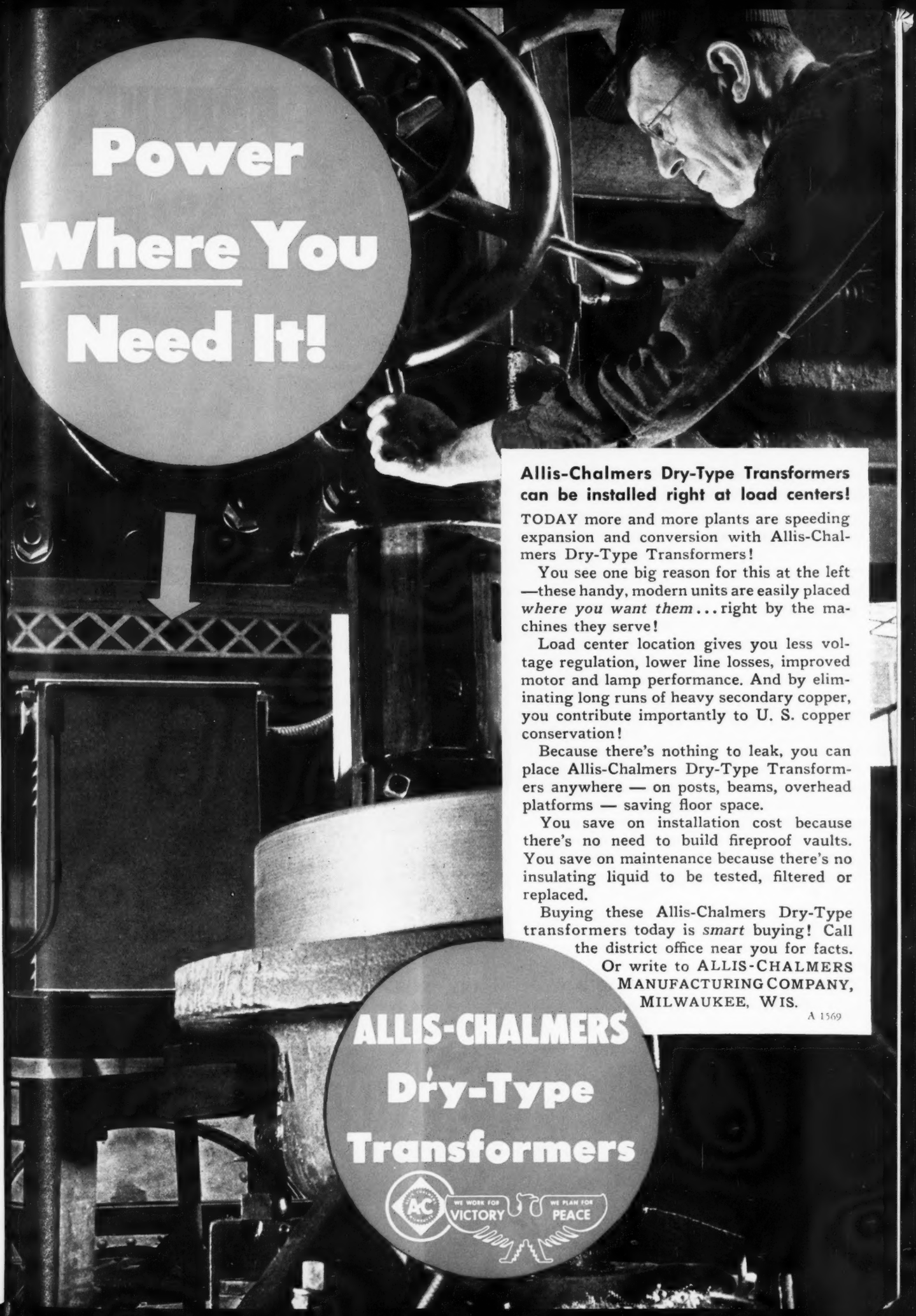
News 68

Cover photo: In their asbestos fire-fighting suits Theodore Azevedo and Manuel Fernandez of the Hawaiian Electric Co. are ready to combat any type of flame. They are pictured atop one of the company's Honolulu buildings.

Directory

knowing where to find the Western representative of a manufacturer saves time and often insures a much more satisfactory transaction than where the negotiations must be carried on by mail. There is a personal element involved which is important to Westerners. For years ELECTRICAL WEST has aided this mutual assistance by publishing a directory of Western representatives of manufacturers. Next month that directory will appear as an annual and a perennial service. The April issue will be one to keep handy all year around for reference.



Allis-Chalmers Dry-Type Transformers can be installed right at load centers!

TODAY more and more plants are speeding expansion and conversion with Allis-Chalmers Dry-Type Transformers!

You see one big reason for this at the left —these handy, modern units are easily placed *where you want them*... right by the machines they serve!

Load center location gives you less voltage regulation, lower line losses, improved motor and lamp performance. And by eliminating long runs of heavy secondary copper, you contribute importantly to U. S. copper conservation!

Because there's nothing to leak, you can place Allis-Chalmers Dry-Type Transformers anywhere — on posts, beams, overhead platforms — saving floor space.

You save on installation cost because there's no need to build fireproof vaults. You save on maintenance because there's no insulating liquid to be tested, filtered or replaced.

Buying these Allis-Chalmers Dry-Type transformers today is *smart* buying! Call the district office near you for facts. Or write to ALLIS-CHALMERS MANUFACTURING COMPANY, MILWAUKEE, WIS.

A 1569

ALLIS-CHALMERS
Dry-Type Transformers

AC WE WORK FOR VICTORY WE PLAN FOR PEACE

RE-LIGHTING

the new **manpower / production** *requirement*

Vital to plants built and lighted for daylight operation

Most plants operating today were designed and built for peacetime, *daylight* working schedules. Wartime production demands night work. *Lighting based on daylight conditions is inadequate to serve the needs of night workers.*

Night production is generally acknowledged to be anywhere from 20% to 40% less efficient than daytime production. And poor lighting, with its consequent eyestrain, fatigue, and lower working efficiency, is a major cause of this slump.

Re-lighting for 24-hour-a-day war production is the easiest, most economical remedy for this condition. Re-lighting does not mean discarding your present lighting system. It merely means bringing the equipment you have up to date by relocating lamps to eliminate glare and shadow; increasing lamp wattages, re-spacing lamps, installing additional equipment to insure uniform lighting levels throughout your plant. A Silv-A-King lighting engineer can tell you exactly.

Silv-A-King's part in the war effort includes the production of parts for torpedoes, bombs, gliders and other aircraft; as well as naval and surgical equipment.

BRIGHT LIGHT REFLECTOR COMPANY, INC.
312 Morgan Avenue, Brooklyn, N. Y.

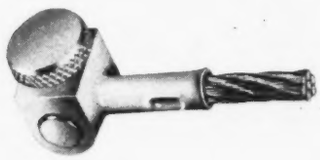
Send for your copy of our 16-page book: "Light Is An Essential Production Tool"

SILV-A-KING MAKES *Light* WORK FOR YOU

PRODUCTS
that are news

Hystud Connector (300)

An electronic tube stud connector has been developed by Burndy Engineering Co. for use in joining flexible leads to filament studs of large electronic tubes. A hyline indent type of connector called the Hystud, this unit is claimed by the manufacturer to give maximum compactness.



Polymerizing Varnish (301)

A polymerizing varnish—Synthite PX-5 Black Baking Varnish—has been developed by the John C. Dolph Co. It is recommended especially by the manufacturer for use on stationary and revolving units constructed with class "B" insulating materials. It is said to possess the essential bonding properties to hold modern types of magnet wire and insulating materials intact under the centrifugal force developed by high-speed unit windings.

This new insulating varnish cures by heat induced chemical polymerization which solidifies the entire mass of varnish in the deepest winding voids or spaces, according to the manufacturer. This curing characteristic is claimed to eliminate surface sealing. The degree of curing can be controlled by varying baking temperatures between 245° and 275° F. and controlling baking hour cycles.

Solder, Tape Alternate (302)

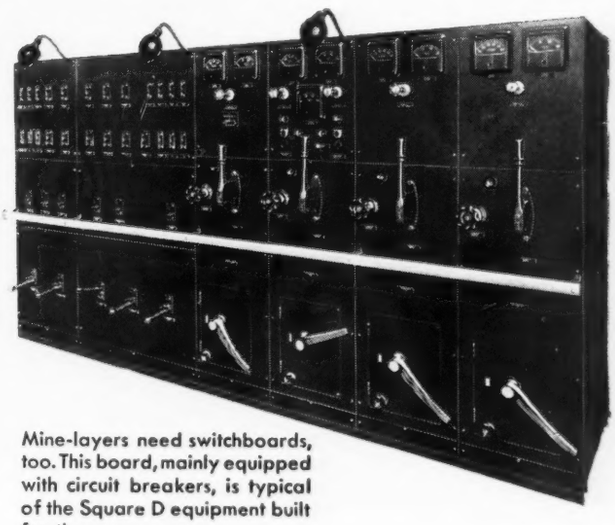
As an alternate for solder and tape under WPB order M-43, Ideal Commutator Dresser Co. offers its screw-on type Wire-Nuts. According to the manufacturer, no rubber, tin or lead are used in Wire-Nuts. They consist of a cone-shaped spiral spring insert, imbedded in a molded insulation. The joint is made by stripping the wires about one-half inch and then screwing the Wire-Nut on the stripped ends. The manufacturer states the insulation will not melt and is puncture proof at 10,000 volts. Five sizes are available for making all combinations of wires from two No. 18 to three No. 10, solid or stranded.

Rubberless Battery Case (303)

Philco Corp., Storage Battery Division, has developed a Vitrabloc storage battery using a vitrified ceramic case composed of non-critical materials to replace rubber jars. Vitrabloc does not absorb moisture, and acid does not penetrate or affect it, according to the manufacturer. Pure white, the jars provide high light reflection to brighten dark battery rooms, it is stated.

Tailored TO FIT THE JOB

Square D has built hundreds of marine switchboards for Army and Navy vessels. At left, ready for shipment, is a line-up of special boards with circuit breaker mains and fusible branches for installation on small Army transport ships.



Mine-layers need switchboards, too. This board, mainly equipped with circuit breakers, is typical of the Square D equipment built for them.

SQUARE D SWITCHBOARDS

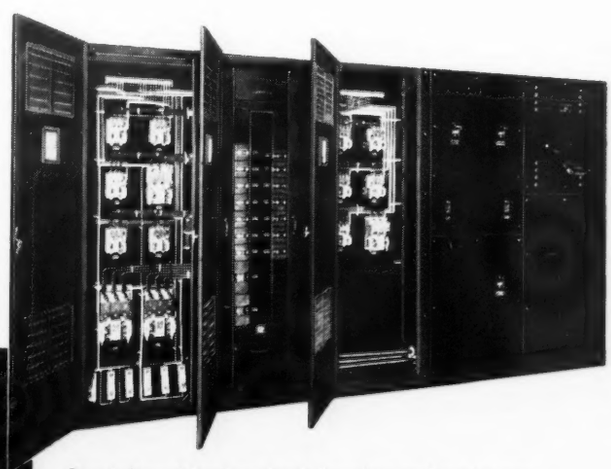
There is more than good workmanship involved in building switchboards for new or unusual applications. It takes a sound analysis of requirements by an engineer who knows his stuff, technically. (That's the Square D Field Engineer.) And it takes seasoned design engineers who chart the course for the men who build. (Years of experience have taught Square D designers the angles which really count.)

When you have a switchboard problem, let a Square D Field Engineer work with you. Maybe he can help you do the job better.

CALL IN A SQUARE D FIELD ENGINEER

You're welcome to the counsel of a Square D Field Engineer in tackling any problem which involves electrical control or distribution. He is in constant contact with plants of every kind and size. He studies methods and applications with the idea of simplifying new jobs or doing old ones better.

There are Field Engineers in Square D branch offices in 52 principal United States and Canadian cities. Their services are dedicated to solving industry's war and postwar electrical problems.



Special combination circuit breaker and motor control switchboard, with ten panels. Panels are arranged back-to-back to conserve space.

SQUARE D COMPANY

LOS ANGELES - DETROIT - MILWAUKEE

KOLLSMAN INSTRUMENT DIVISION, ELMHURST, NEW YORK

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO

Want to help a

"WHY CAN'T I EVER FIX THINGS?"

Don't forget, lady, your electric appliances are precision-built for long life and maximum service. They were put together by experts and they must be repaired by experts. That's why it is wiser and more economical to call on a skilled specialist at once.

The General Electric Appliance Service man has the "Know-how," the necessary replacement parts and the proper tools. In addition, he can give you a lot of good advice on the proper use and care of your appliances.

You'll soon be seeing this illustration and text as one of a series of General Electric Consumers Institute advertisements appearing in National Women's Service magazines. It's part of the story, your story, G-E is telling to Mrs. America.

STRAIGHT THINKING
The story of the Appliance and Merchandise Dept. of
GENERAL ELECTRIC
and its consumer-dealer relations
WHAT WE HAVE DONE
WHAT WE ARE DOING
WHAT WE PLAN TO DO

Ask to See "Straight Thinking"

The story of G-E's wartime program planned to *help* you. Includes a lot of darned interesting ideas—for instance, the complete set-up of this year's new advertising campaigns that have been planned for *1943* needs. Get your G-E Distributor to show you a copy of "Straight Thinking." It'll help.

LOOK FOR THESE G-E CONSUMERS INSTITUTE ADS IN THESE MAGAZINES WHICH APPEAR ON NEWSSTANDS IN APRIL

These G-E Consumers Institute Advertisements are but a part of the company-wide General Electric advertising schedule.

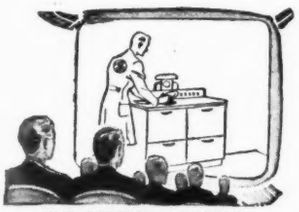
Saturday Evening Post ..... April 10
Collier's ..... April 10
Look ..... April 6
New York Times Magazine ... April 18

American Home . May	Ladies Home Journal May
House Beautiful . May	Good Housekeeping . May
Holland's ..... May	Country Gentleman .. May

WAR BONDS WILL BUILD AND EQUIP NEW

a Lady in Distress ?

HERE'S HOW WE'LL HELP YOU HELP HER



G-E SERVICE SCHOOLS

Attendance in early 1943 schools topped all previous records! Features include new full-color movie, sound slide films, demonstrations with practical repair and maintenance instruction. Ask your G-E Distributor for complete details on next sessions, or write to the Product Service Section, General Electric Company, Bridgeport, Conn.

SERVICE STORE DISPLAY

Made in two parts (you can detach the Appliance Service Center Dealer Section and use it separately if you wish). It's a big display—4 ft. high and over 2 ft. wide. For floor and window use. Puts the spotlight on your store as Appliance Service Headquarters—Price only $1.50 each, postpaid. Order yours from your G-E Distributor or write for information to Adv. Div., General Electric, Bridgeport, Conn.

SECRET OF SUCCESS

Ask any successful Appliance Serviceman this question: "What is most helpful to you in your business?" Invariably his answer is: "THE PRODUCT MAN." For over 14 years this publication (issued monthly by G-E's Appliance and Merchandise Department) has been the direct link between the factory and the field servicemen.

Each issue contains 25 to 30 pages of "work-facts" and "know-how" on servicing G-E Appliances. Only $1.15 a year. If you're not a subscriber, get on the list today, through your G-E Distributor. Ask him, too, about yearly volumes bound in heavy duty covers for only $2.00 per copy.

NEW "KNOW-HOW" HANDBOOK

Here's practically a new, just-off-the-press service manual that tells all you ever need to know about servicing the famous DR type General Electric sealed refrigerating units. You'll find this new DR Manual ideal for instructing new service personnel, and a fast refresher course for veterans. Get your copy through your Distributor.

HERE'S HOW YOU CAN HELP HER

BUSINESS BOOSTER!

Maybe she'll insist, anyway, on trying to make minor cleaner repairs herself. You can be of real service to these home-mechanics if you stock and display the genuine G-E Cleaner Parts Kits. Each Kit contains an assortment of vital parts, such as brushes, wheels, belts, springs and many others. Get complete information today from your General Electric Cleaner Distributor.

FIRST AID FOR FANCY FINISHES

Next time a worried housewife asks you about protecting the painted finish on her appliances, tell her about G-E Liquid Wax. Ideal for all synthetic surfaces. (For Porcelain? No-o-o!) G-E Liquid Wax comes in full pint cans. Nice, eh!

REPLACEMENT PARTS

G-E has a replacement stock pile that's 98% complete. Don't let your stock of replacement parts get low. Send in old appliance parts. Old ones make new ones in wartime.

THE G-E CONSUMERS INSTITUTE

Tell her how the G-E Consumers Institute is carrying on constant research on such wartime home problems as Nutrition, Food Preparation, Appliance Care and Repair, Laundering, Home Making. Tell her about the General Electric Consumers Institute booklets and bulletins. Favorites are:

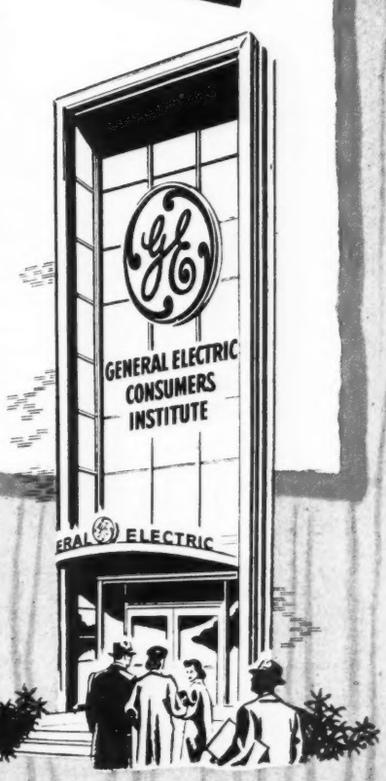
A Captain In The Kitchen

How To Get The Most Out of the Food You Buy

Pack A Lunch That Packs A Punch

Keep It Working folders

Get samples and prices from your G-E Distributor or write to the General Electric Consumers Institute.



GENERAL ELECTRIC

VICTORY HOMES TOMORROW!

"SEE-ABILITY" saves critical!

AMERICAN industry has been accustomed to an abundance of metals. A little wasted was not serious.

Today the situation is different. We need to turn out finished products not only faster but with *less waste*.

Fortunately, much of the waste in manufacture can be avoided by applying the principles of good light. The "SEE-ABILITY" which good light provides makes for more accurate workmanship, permits greater care in check-ups and inspections, increases the speed of production for our war effort.

Good lighting comes not only from properly installed equipment—but also from proper maintenance. A new book—"SEE-ABILITY FOR INDOOR EYES," published by Westinghouse describes many of the ways of getting more light from present equipment.

Westinghouse is sending this book to production men and business men who may be interested. For additional information, write Westinghouse, Lamp Division, Bloomfield, New Jersey.

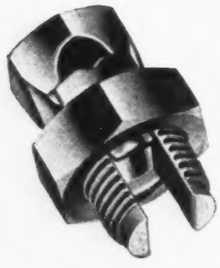
The heart of good lighting is the lamp. To maintain lighting equipment at peak efficiency, recommend Westinghouse Mazda Lamps. They stay bright from end to end, have a longer life, and cost less today than ever before.

Westinghouse

★ MAZDA LAMPS ★

FOR GREATER "SEE-ABILITY"

RELIABLE Connectors



Save Time

by using solderless connectors with accurately fitting precision threads which insure easy, permanent installations.

Save Copper

by using these connectors which are good as new after being salvaged.

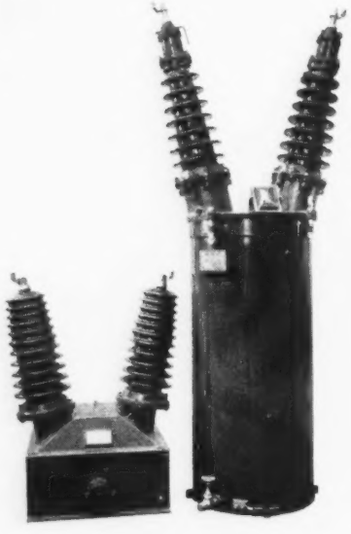
EASY TO INSTALL
LOW IN COST

Reliable
ELECTRIC COMPANY
OVER 30 YEARS SERVICE TO THE UTILITIES
3145 CARROLL AVENUE · CHICAGO ILLINOIS

Potential Transformers (304)

A new line of two-bushing outdoor potential transformers rated 24 to 69 kv., 50/60 cycles has been announced by General Electric Co. The new units, Type E-236 superseding Type E-116, have been reduced 15 to 50% in height, 10 to 60% in weight, and 45 to 90% in liquid volume, depending on the rating of the transformer. According to the manufacturer, these reductions mean that the transformers can be mounted up in the substation structure with the small size G-E current and single-bushing transformers.

These transformers are hermetically sealed by means of sealed bushings, all-welded steel tank and sealed-in-glass secondary terminals. Can be supplied filled either with Pyranol or oil. Illustration gives comparison between the new type and Type E-116.



Airport Lighting Switches (305)

A new line of switches for control of airport runway lighting is being offered by Westinghouse Electric & Mfg. Co. The line includes runway selector and brightness selector switches. Similar in appearance and construction, both types incorporate mechanically interlocked preset switches.

The runway selector switch consists of a two-stage rotary type switch having adequate contact capacity to handle all control requirements, according to the manufacturer. Mechanically interlocked with the selector switch are two double-pole, single-throw, preset switches wired to permit operation of (1) the contact lights along any runway; (2) any group of flood lights; (3) any group of floodlights and corresponding runway contact lights. The mechanical interlocking device locks the selector switch in the position last selected.

The brightness selector switch is a five-position switch for selection of five stages of brilliancy of the runway contact lights.

Fluorescent Unit (306)

Lighting Products Inc. has announced a fluorescent fixture available for two, three or four 40-watt and two 100-watt lamps. The entire wire way is of rigid metal construction and may be completely exposed for easy installation or maintenance, according to the manufacturer. Ballast is inverted and exposed for longer life and cooler operation. Reflector is of masonite. Louvres of masonite and klasium white enameled may be added to fixtures where shielding is desired. May be surface chain mounted, pipe mounted individually or in continuous runs.

Portable Pipe Bender (307)

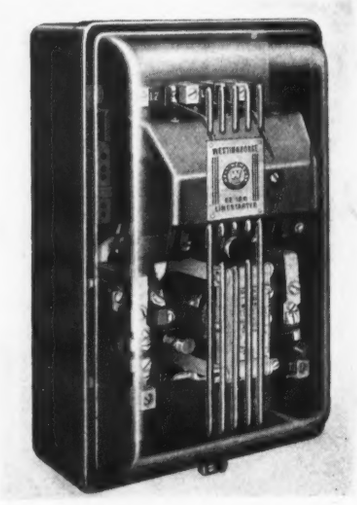
A portable hydraulic pipe bender has been announced by Tal's Prestal Bender, Inc. This device bends up to approximately 180 degrees depending on the size of pipe. Bending formers are in sizes from ⅜ to 3 in. Weight with seven formers, extension piston and flatter, 158 lb. Requires no bolting, no bench or table, the manufacturer states.

Reset Timers (308)

R. W. Cramer Co. has announced two new synchronous motor driven timers of the reset type. The new timers are available for time ranges up to five hours and longer if desired. They repeat their time cycle upon manual operation of a built-in start button and indicate by means of a progress indicator the expired and unexpired time cycle and the setting time.

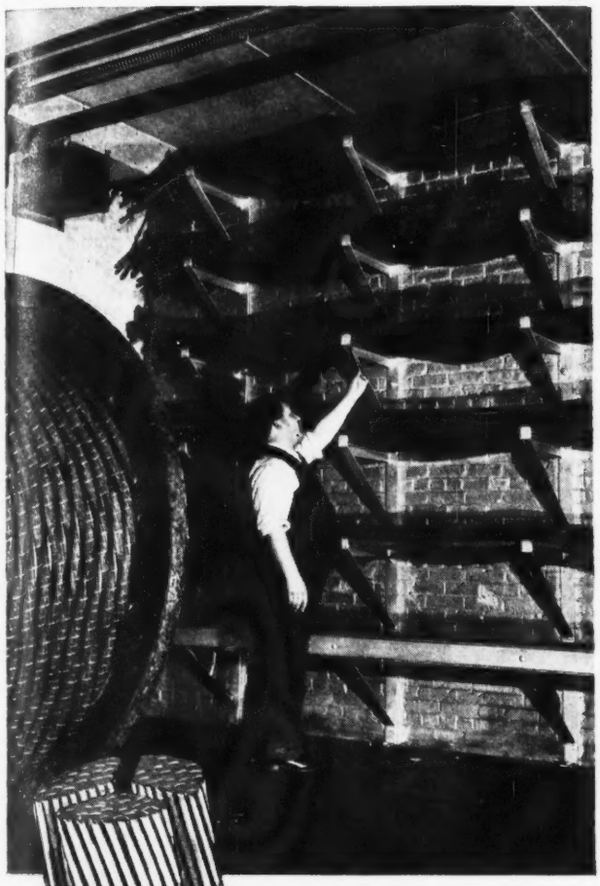
These timers operate a single pole, double throw switch with a capacity of 10 amp. at 115 volts or 5 amp. at 220 volts a-c non inductive load. According to the manufacturer they will control a 1/3-hp. motor load, a heater load up to 1,200 watts, a lamp load up to 250 watts or a relay load which does not exceed 15 amp. inrush at 115 volts a-c.

Linestarter (309)



Westinghouse Electric & Mfg. Co. has announced a new Size 2 Linestarter for machine tools, textile machinery, pumps, fans, etc., which it claims requires less than half the mounting space of former units without sacrifice of wiring space. Designed for group mountings, built-in applications or remote mountings, this unit has a clapper-type armature with knife-edge bearings. It utilizes double-break silver to silver contacts thus eliminating shunts and reducing maintenance, the manufacturer states. Overload relays are reset either by hand or automatically. On applications requiring sequence or auxiliary interlocking, provision is made for a total of four normally open or normally closed electrical interlocks.

Insulation Stability at High Temperature with Metallized Paper Tapes



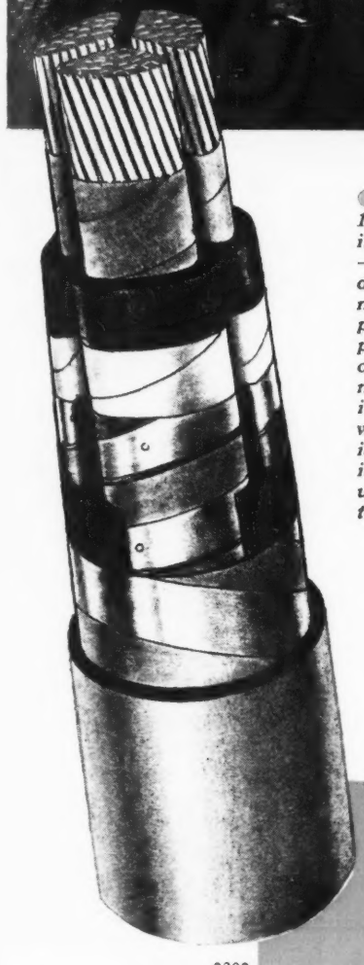
Today's heavy loads on power cables develop temperatures that will hasten deterioration of the insulation unless the proper safeguards are incorporated.

Studies made in the Okonite-Callender Research Laboratories have shown that one of the big factors in the deterioration of oil-impregnated paper-insulated cables is the effect of the metal in contact with the oil. Copper especially has a very pronounced reaction.

Careful analysis proved that these reaction products were concentrated in the first tapes directly over the conductor and also adjacent to the sheath. Our research engineers searched for and found a method of stopping these harmful products (formed by the reaction between copper and oil) from entering the dielectric.

By applying metallized paper tapes under and over the insulation, an efficient absorption medium is provided that also functions as a barrier for holding the harmful products out of the insulation itself.

The results of radial power factor tests (previously published – Bulletin OK-2022) clearly demonstrate these advantages. They have also been confirmed after long time aging tests of the cable itself as indicated below.



Oven maintained at 100° C. for long time aging tests on power cables, – following the practice developed by one of the major utilities. The samples with ends sealed are placed in the oven. Periodic power factor measurements are checked against initial values. A cable with poor aging characteristics will show a marked increase in power factor under these severe conditions.

	Length A	Length B
Initial Power Factor	0.31%	0.29%
After 1 year at room temperature	0.29%	0.30%
After 1 year at 100° C. in oven	0.34%	0.33%

Tests records show this remarkable stability as checked on two 20-foot lengths of 12 K.V. three-conductor Okonite-Callender cable with metallized paper tape barriers. Practically no change in power factor takes place.

When you are considering paper-insulated cable, it will pay you to have our engineers show you all the facts on this and the many other developments made

Through OKONITE-CALLENDER RESEARCH

THE OKONITE-CALLENDER CABLE CO., INC.

An Affiliate of The Okonite Company

Executive Offices: Passaic, N. J. • Offices in principal cities

OKONITE CALLENDER

PAPER INSULATED POWER CABLES

3200

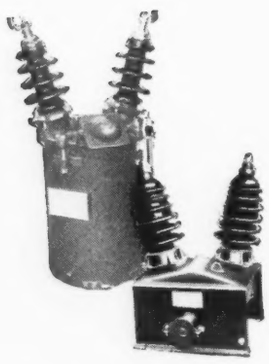
Salvage Your Scrap – Buy U. S. War Bonds

Announcing

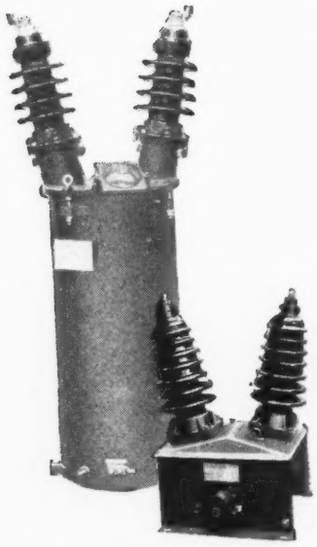
NEW OUTDOOR POTENTIAL TRANSFORMERS

THAT SAVE VITAL MATERIALS

NOTE THESE REDUCTIONS IN SIZE, WEIGHT, AND LIQUID VOLUME



24,000/120 Volts



34,500/115 Volts

	Type E-116	Type E-236	Type E-116	Type E-236
Height—inches	42	34¼	71	36½
Width of Base—inches	15¼	18	19	19
Net Weight—pounds	350	320	850	350
Liquid Volume—gallons	9	5	45	6

HERE ARE THE SAVINGS the Type E-236 transformers make possible for you—in addition to saving vital materials in manufacture.

SAVE SPACE

Their light weight and small size enable you to mount them in the steel structure and thereby save valuable ground space.

SIMPLIFY CONNECTIONS

Mounting in the structure simplifies primary (high-voltage) connections.

SAVE FOUNDATION EXPENSE

Mounting in the structure also eliminates the need for constructing a separate foundation.

REDUCE MAINTENANCE

The insulating liquid need not be tested or inspected, because it is hermetically sealed in—there are no gaskets on these transformers.

CHARACTERISTICS

All improvements have been accomplished without any sacrifice in accuracy or insulation—the two most important characteristics of any instrument transformer.

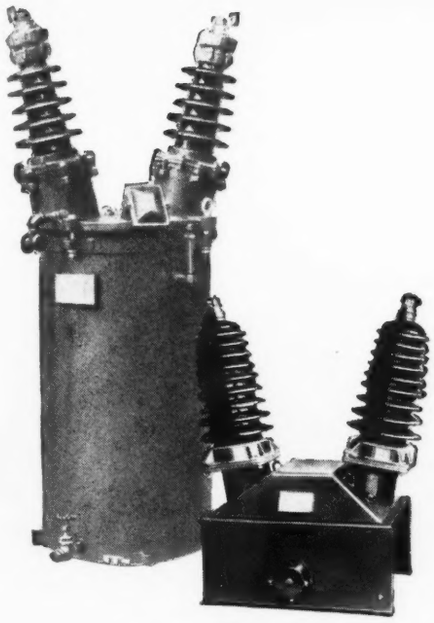
ACCURACY—These transformers meet the highest accuracy classification, ¼W, ¼X, ¼Y, ¼Z, and they are suitable for both metering and relaying.

INSULATION—Ample insulation is provided to meet the ASA standards for impulse tests, as indicated by the following test data:

Transformer Voltage	Dielectric Tests	
	Full-wave, Kv	Low-frequency, Kv
24,000/120	150	51
34,500/115	200	70
46,000/115	250	93
69,000/115	350	140

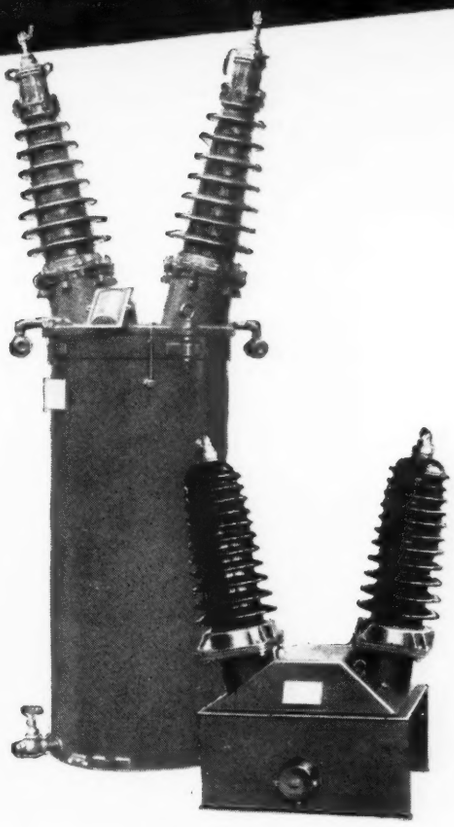
GENERAL ELECTRIC

TYPE E-236
TWO-BUSHING
PYRANOL OR OIL-FILLED
24 KV TO 69 KV
They Supersede the Type E-116



46,000/115 Volts

Type E-116	Type E-236
81¼	45
26¼	21½
1700	550
100	9



69,000/115 Volts

Type E-116	Type E-236
108	55½
26¼	28½
2400	1000
125	20

Completes Our Line of Small-size Outdoor Current and Potential Transformers

BECAUSE you can get G-E outdoor current and single-bushing potential transformers of corresponding small size and light weight, you can take full advantage of the small size of these new two-bushing units. You can now mount all your transformers up in the structure, and get the full benefit of foundation savings.

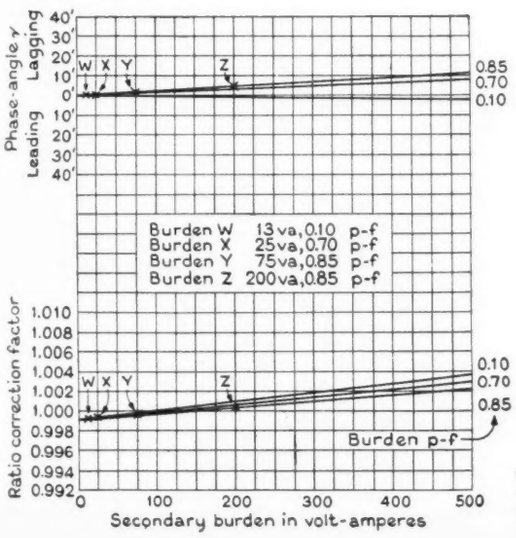
All these transformers are available filled with Pyranol* (or oil if you prefer). Because instrument transformers are such a vital link in the protection of your system, you'll want to insist on Pyranol—the G-E insulating and cooling liquid which is chemically stable. It means greater safety, too. It is noninflammable.

You can adopt G-E instrument transformers as standard for your system. General Electric makes a complete line of indoor currents and potentials, and portables as well.

For additional information about these new E-236 units, ask for Bulletin GEA-3982. Also, the specialist in the nearest G-E office will be glad to work with you in applying instrument transformers for either metering or relaying.

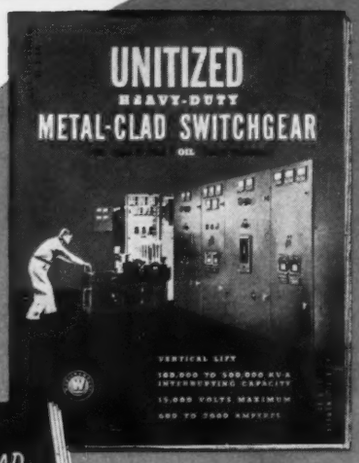
General Electric Company, Schenectady, N.Y.

Reg. U.S. Pat. Off.



Ratio and phase-angle curves of the 69-kv unit—at 60 cycles, 115 secondary volts. (This is typical of the curves for all these transformers.)

The Army-Navy "E", for Excellence in the manufacture of war equipment, now flies over six G-E plants employing 100,000 men and women.



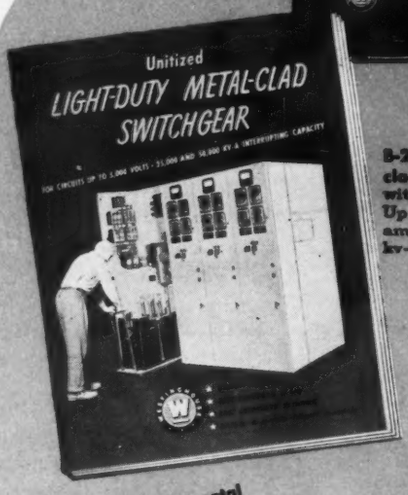
B-3035—Heavy-duty Metal-clad UNITIZED Switchgear with OIL breakers. 15,000 volts max., 600 to 2000 amps. 100,000 to 500,000 kv-a interrupting capacity.

These 4 books

SUPPLY THE ANSWERS TO

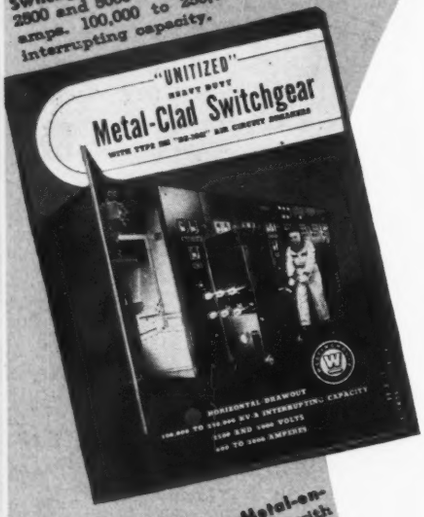
YOUR

SWITCHGEAR REQUIREMENTS

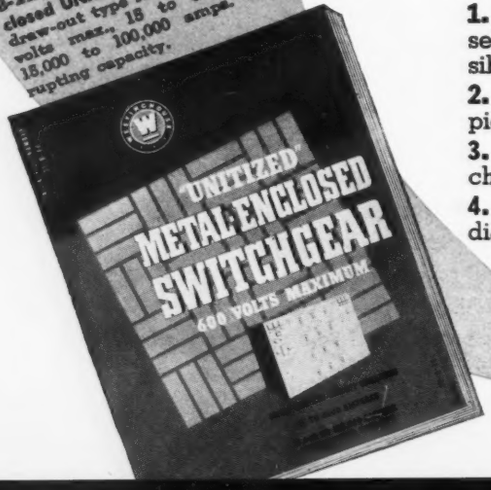


B-2273—Light-duty Metal-clad UNITIZED Switchgear with OIL circuit breakers. Up to 5000 volts, 600 to 2000 amps. 25,000 and 50,000 kv-a interrupting capacity.

B-3036—Heavy-duty Horizontal draw-out Metal-clad UNITIZED Switchgear with AIR breakers. 2300 and 5000 volts, 600 to 2000 amps. 100,000 to 250,000 kv-a interrupting capacity.



B-2296—Light-duty Metal-enclosed UNITIZED Switchgear with draw-out type AIR breakers. 600 volts max., 15 to 6000 amps. 15,000 to 100,000 amps. interrupting capacity.



select switchgear the UNITIZED way...

save ordering time . . . delivery time
. . . installation time!

These four books can save you up to 30% of the time usually required to order, build and install switchgear. They describe Westinghouse UNITIZED switchgear which has standardized switchgear apparatus into simple basic units.

This simplification reduces ordering to two simple steps:

1. Select the units you require by number as described in these books.
2. Draw a single-line circuit diagram and specify capacities.

We build your units from standard plans, with standard parts and materials on a standard production basis. You receive UNITIZED switchgear, completely assembled, wired and tested, ready for quick installation.

UNITIZED switchgear is in step with today's wartime demands. It eliminates the time and expense involved in the planning of detailed specifications for each individual job. Get the books you need from your Westinghouse representative or write Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., Dept. 7-N.

THESE STEPS SAVE UP TO 25% OF ORDERING TIME

1. Instead of consuming time in selecting between variations possible with custom-built switchgear
2. . . . you select one UNITIZED piece for the job
3. . . . by checking a simplified chart and
4. . . . drawing a one-line circuit diagram and specifying capacities.

THESE STEPS SAVE UP TO 20% OF BUILDING TIME

1. We have 100% standardized drawings already made.
2. We proceed to build from standard stock parts and materials.
3. You receive complete switchgear—on schedule.
4. You install quickly as a unit.

J-60518-A

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

UNITIZED SWITCHGEAR

100H UNIVERSAL MATTHEWS FUSE LINKS

COVERED BY PATENTS 1,797,850, 2,067,577 AND PATENTS PENDING

BEST FOR CASCADING

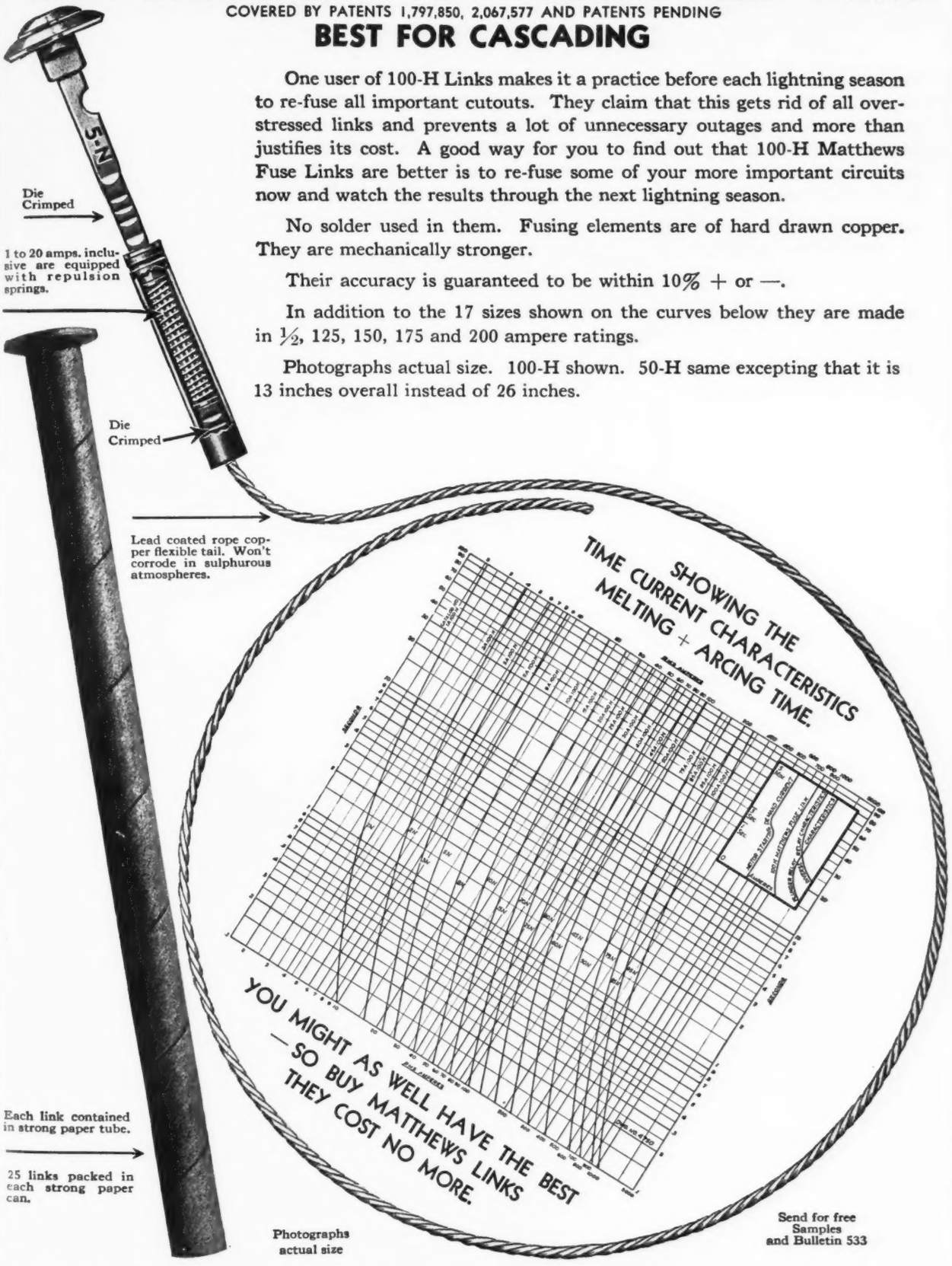
One user of 100-H Links makes it a practice before each lightning season to re-fuse all important cutouts. They claim that this gets rid of all over-stressed links and prevents a lot of unnecessary outages and more than justifies its cost. A good way for you to find out that 100-H Matthews Fuse Links are better is to re-fuse some of your more important circuits now and watch the results through the next lightning season.

No solder used in them. Fusing elements are of hard drawn copper. They are mechanically stronger.

Their accuracy is guaranteed to be within 10% + or —.

In addition to the 17 sizes shown on the curves below they are made in ½, 125, 150, 175 and 200 ampere ratings.

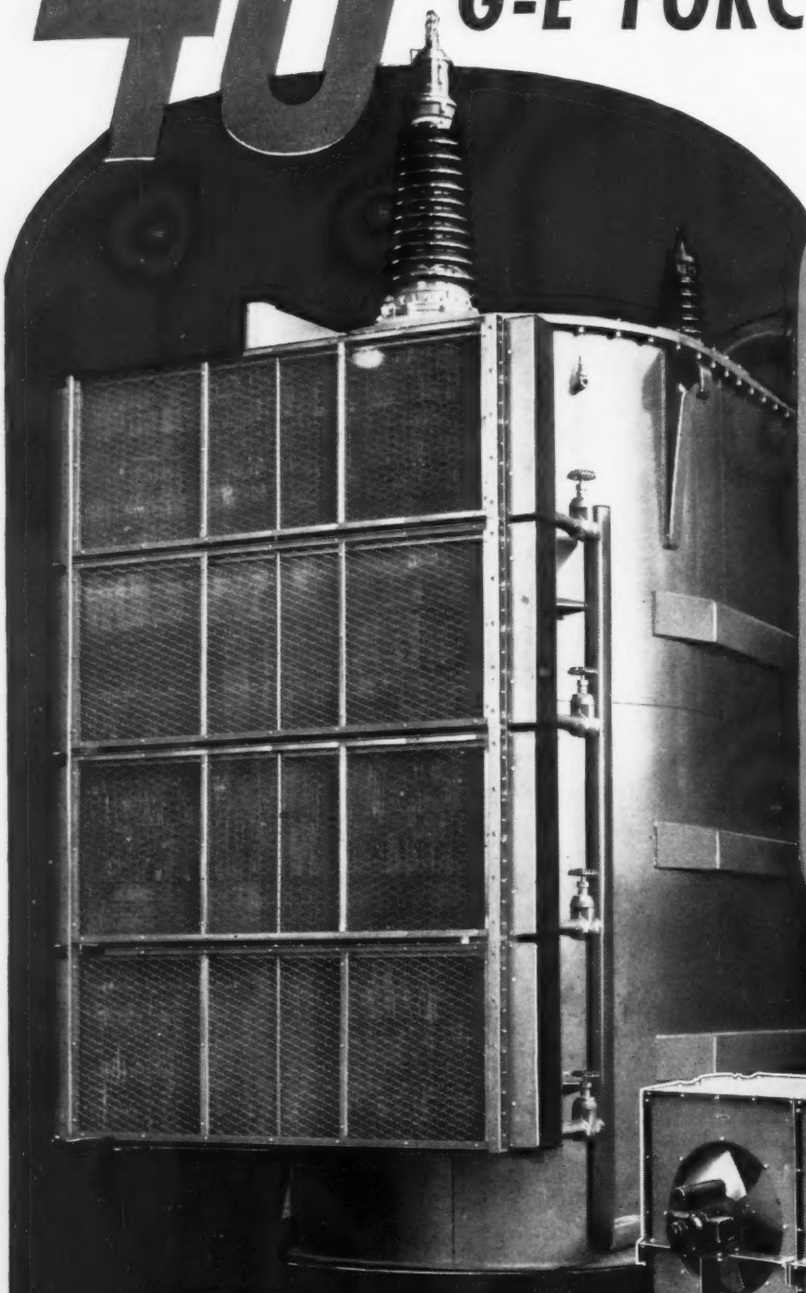
Photographs actual size. 100-H shown. 50-H same excepting that it is 13 inches overall instead of 26 inches.


5-N
Die Crimped
1 to 20 amps. inclusive are equipped with repulsion springs.
Die Crimped
Lead coated rope copper flexible tail. Won't corrode in sulphurous atmospheres.
Each link contained in strong paper tube.
25 links packed in each strong paper can.
SHOWING THE TIME CURRENT CHARACTERISTICS MELTING + ARCING TIME.
YOU MIGHT AS WELL HAVE THE BEST —SO BUY MATTHEWS LINKS THEY COST NO MORE.
Photographs actual size
Send for free Samples and Bulletin 533

W. N. MATTHEWS CORPORATION, ST. LOUIS, U. S. A.

40% Less Material..

G-E FORCED COOLING



G-E forced-cooled (forced-oil, forced-air-cooled) transformer. Single-phase, 3-winding, rated 40,000 kva, 138,000 volts, 60 cycles

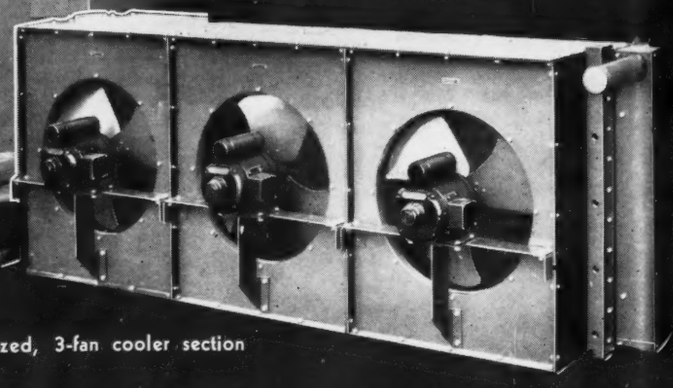
Here's How Forced Cooling Works

IN the G-E forced-oil, forced-air-cooled transformer the oil is pumped through a fan-cooled, fin-type cooler.

The cooler is made up of one or more standardized units, the number depending upon the amount of heat to be dissipated. Each unit is provided with individual shut-off valves to permit its removal without shutting down the remainder of the cooler.

An all-weather fan, with highly efficient, aphonic blades, and a Thermo-Tector switch protect the motor for efficient and safe operation.

The oil pump and motor are immersed in the circulated transformer oil, thus eliminating the need for a stuffing box.



Rear view of standardized, 3-fan cooler section

...and a Better Power Transformer ...G Brings You These Benefits

UP TO 40% LESS WEIGHT — Reduces first cost. Saves expense, both in the foundation and in handling.

Doubles the kva that can be shipped assembled where ***weight*** is the limiting factor.

UP TO 50% LESS VOLUME — Permits smaller station structures.

Triples the kva that can be shipped assembled where ***size*** is the limiting factor.

SHIPPED ASSEMBLED — Saves time and cost when installing.

Reduces the possibility of error and contamination from field assembly.

Permits metal-sealing of most oil joints, reducing the number of gaskets.

These benefits are obtained while maintaining the electrical safety factors, short-circuit strength, and full life expectancy.

Positive liquid-tight pump—no stuffing box, no gaskets, no leaks, no maintenance

FOR INCREASING CAPACITY, TOO

Forced-air, forced-oil coolers can also be used to increase the capacity of power transformers already installed by augmenting—or completely replacing—self-cooled, air-pressure-cooled, or water-cooled systems.

Your G-E representative will be glad to obtain for you detailed recommendations covering G-E forced-cooled power transformers for your requirements. Ask for Bulletin GEA-3934. *General Electric Company, Schenectady, N. Y.*

GENERAL ELECTRIC

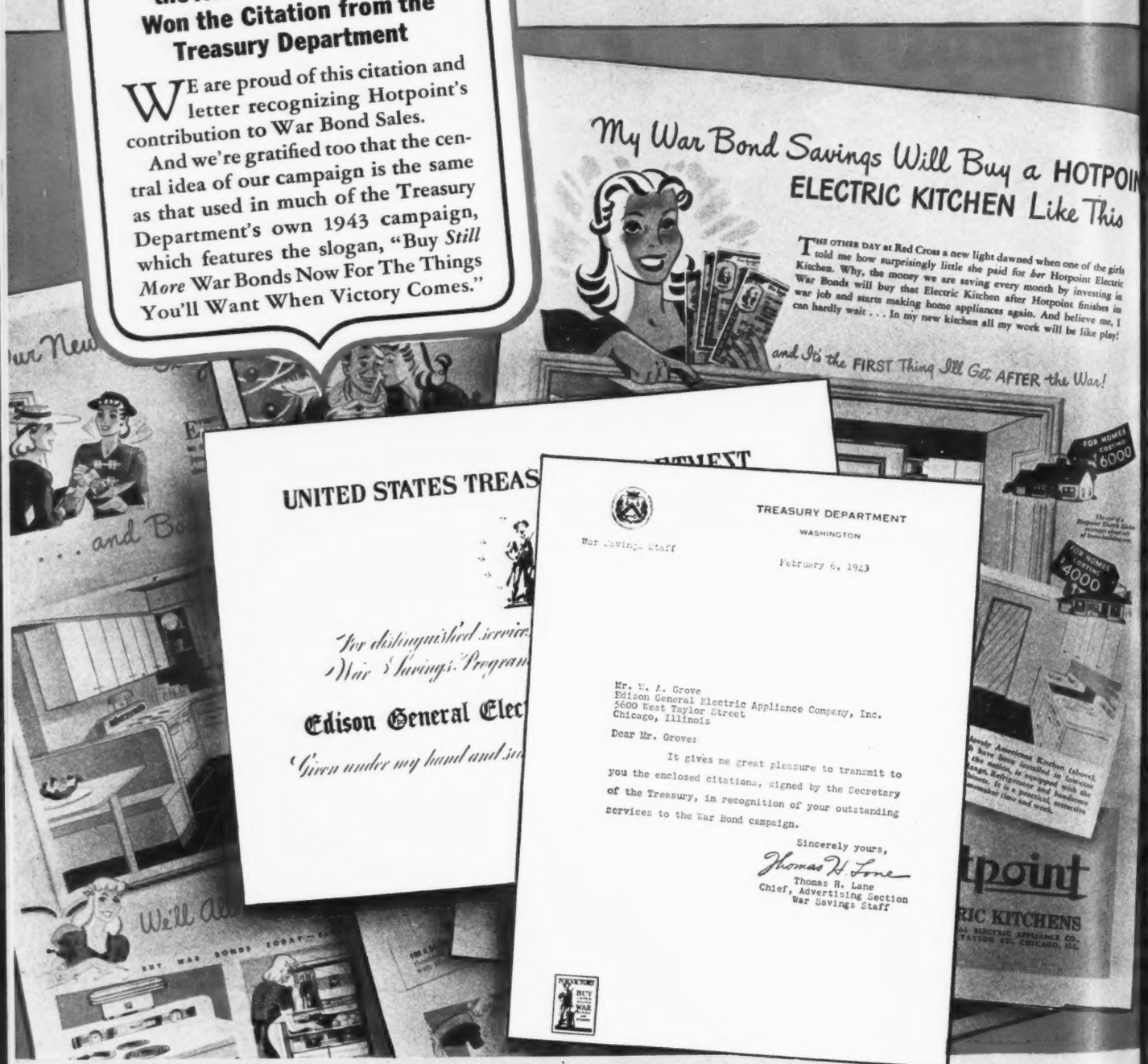
401-11-6166

HOTPOINT Cited For Wartime

Here Are Some of the Advertisements That Won the Citation from the Treasury Department

WE are proud of this citation and letter recognizing Hotpoint's contribution to War Bond Sales.

And we're gratified too that the central idea of our campaign is the same as that used in much of the Treasury Department's own 1943 campaign, which features the slogan, "Buy *Still More* War Bonds Now For The Things You'll Want When Victory Comes."


My War Bond Savings Will Buy a HOTPOINT ELECTRIC KITCHEN Like This
THE OTHER DAY at Red Cross a new light dawned when one of the girls told me how surprisingly little she paid for her Hotpoint Electric Kitchen. Why, the money we are saving every month by investing in War Bonds will buy that Electric Kitchen after Hotpoint finishes its war job and starts making home appliances again. And believe me, I can hardly wait . . . In my new kitchen all my work will be like play!
and It's the FIRST Thing I'll Get AFTER the War!
UNITED STATES TREAS
For distinguished service
War Savings Program
Edison General Elec
Given under my hand and
TREASURY DEPARTMENT
WASHINGTON
War Savings Staff
February 6, 1943
Mr. W. A. Grove
Edison General Electric Appliance Company, Inc.
5600 West Taylor Street
Chicago, Illinois
Dear Mr. Grove:
It gives me great pleasure to transmit to you the enclosed citations, signed by the Secretary of the Treasury, in recognition of your outstanding services to the War Bond campaign.
Sincerely yours,
Thomas H. Lane
Thomas H. Lane
Chief, Advertising Section
War Savings Staff
FOR HOMES COSTING 6000
FOR HOMES COSTING 4000
tpoint
RIC KITCHENS

REFRIGERATORS
RANGES
WATER HEATERS
WASHERS AND IRONERS
CLOTHES DRYERS
AUTOMATIC DISHWASHERS
ELECTRASINK
STEEL CABINETS

Buy War Bonds Today

Hotpoint

For Outstanding Advertising!

Hotpoint is Again On The BOND WAGON For 1943!

NATIONAL ADVERTISING

aturally, Hotpoint will follow up the success of e 1942 advertising program which was so enthu-stically acclaimed by utility companies, large re-lers and official Washington. The program not lywill be continued, but will be expanded in 1943, th four-color advertisements in *Life, Collier's, Ladies' ome Journal, American Home, Better Homes & Gar-ns, House Beautiful* and *Brides Magazine*—PLUS...

Use This New Wartime Promotion Program

STIMULATE War Bond Sales, and help yourself as well, with this new plan book. Full of ideas—for instance, the "Home Planning File", featured in Hotpoint's magazine advertising. Co-operate in this program. While it speeds Victory, it is building peacetime prosperity and employment.

NEW FARM ADVERTISING

nerica's two leading farm publications, *Country Gen-man* and *Farm Journal,* will carry special color pages rough 1943, to help support the Government's ar Bond Program for farmers, and to help build a st-war farm market for Hotpoint Electric Kitchens. so, regular pages will be used in *Electricity on the rm.* When the war ends, American farmers will be osperous and *able* to buy. Because of Hotpoint's tensive program they will be familiar with the eat advantages of Hotpoint Electric Kitchens for m use and be *willing* as well as *able* to buy them.

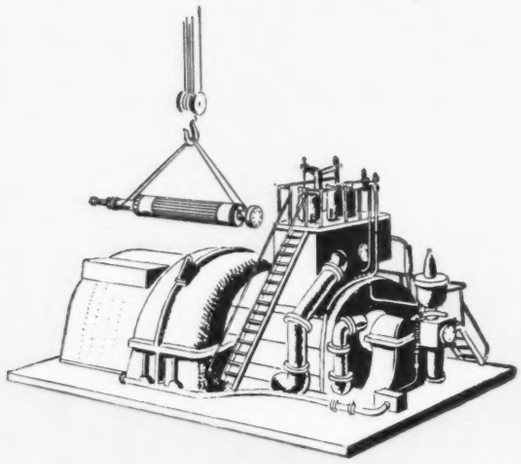
LOCAL ADVERTISING PLANS

For your own spring promotions, you will find this program made to order. The 1943 "Bond Wagon" Plan Book tells how to use Hotpoint's War Bond advertising theme in your own newspaper advertising and in customer contacts. See your Hotpoint distributor or factory representative. Edison General Electric Appliance Co., Inc., 5612 W. Taylor St., Chicago, Ill.

Electric Kitchens Tomorrow!

ELECTRIC KITCHENS

MORE KILOWATTHOURS FOR VICTORY



62% MORE KW!
44% MORE KV-A!

. . . gained by modernizing an old turbine

A western utility demonstrates that, for increased capacity, it pays to look first to your present equipment. An old 25,000 kv-a, 80% power-factor turbo-generator was increased to 36,110 kv-a, 90% power factor—an increase of 62% in kw rating and of 44% in kv-a.

The generator output was increased by various improvements to get greater thermal capacity. Losses were reduced by the use of nonmagnetic material in vent duct spacers, through-bolts, and end spacers. Ventilation of end turns was improved and new blowers were installed. Stator copper was increased by punching larger slots in the old iron and rewinding. More field copper was added to the rotor by machining deeper coil slots and rewinding.

The turbine output was increased by slight changes in design. The blading needed replacement. New modern blades and nozzles were supplied which helped increase the output.

With a minimum use of critical materials, sorely needed extra capacity, not obtainable in any other way, was provided.

This is typical of the work now being done by Westinghouse field and engineering service. Similar rehabilitation and modernization may be a solution to some of your problems. Our engineers will be glad to give you full co-operation and immediate attention. Just phone our nearest office. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

J-97067

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

If It's B.T.C. Forged

You Can Depend On It

Dependable in design—dependable in strength. B.T.C. is proud of its record in the transmission field, for where strength, lightness and uniformity is paramount, the decision to use a forging is universal practice. In the transmission field it's a B.T.C. forging.

May we send you our Hi-Line Reference Book? It will prove a valuable working tool in your files.

B-T-C

Through your Insulator Manufacturer only.

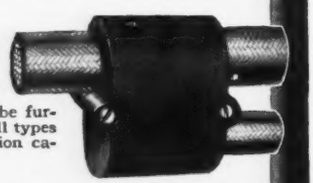
Forged Hi-Line Hardware

THE BREWER-TITCHENER CORPORATION
CORTLAND, NEW YORK

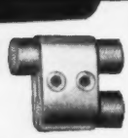
from the MOST COMPLETE lin
of Cable Taps

Now you can select from a really *complete* line of standard and special taps. Every one carefully designed and manufactured.

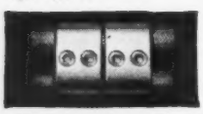
Parallel and 90° taps — and combinations — in the widest variety. For conductor sizes up to 1,000,000 CM.



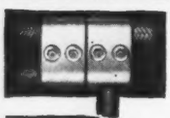
Gutter Tap with Bakelite Cover. Insulating covers can be furnished for all types of Penn-Union cable taps.



2-way Gutter Tap. Main and branch sizes 8 to 1,000,000.



Two Separate Parallel Taps to a continuous main conductor.



Combination Cable Taps; one branch parallel to main, and one at 90°.

Hinged Clamp of Penn-Union Type HFM makes installation easy. Multi-slit tapered sleeve assures permanent grip on branch.

Positive Equalized Pressure on main and branch, with Penn-Union Type SM. Tightening torque is accurate measure of the clamping force.

F. M. NICHOLAS CO.
1123 Harrison St., San Francisco
KENNETH ANDERSON CO.
334 East 4th St., Los Angeles
NORTHWESTERN AGENCIES
2411 First Ave., Seattle, Washington
Penn-Union Electric Corp., Erie, Pa.

PENN-UNION
Conductor Fittings

High-Speed Relay (310)

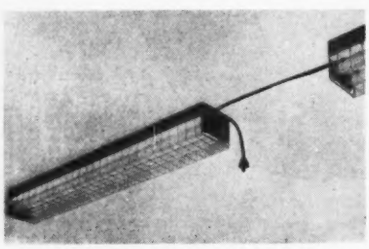
A new generator differential relay has been designed by General Electric Co. for use in generator protection. It is a high-speed, induction-cylinder device and is said to incorporate a new principle called "product restraint" with variable slope characteristics.

According to the manufacturer, this new combination eliminates difficulty with high-speed generator relays due to the transient current transformer errors on heavy through faults. Use of the "product restraint" principle is claimed to assure positive operation on internal faults since the restraining force in case of any single-end-feed condition will be zero or negative because one of the two terms making up the product is zero.

The relay is 20 5/16 in. by 5½ in. in the standard three-element drawout case and can be supplied for surface or semi-flush mounting. Each element of the relay is of the eight-pole, induction-cylinder type. Three poles are used for the differential operating function and three poles provide the "product restraint".

Mechanic's Light (311)

Lumidor Mfg. Co. has developed a double-circuit mechanic's light with receptacles for plugging in small power tools and additional fixtures. As many as four lights



can be connected in line to a maximum of 60 ft. from a single outlet, the manufacturer states. A 24-in. unit containing two 20-watt lamps and a 48-in. unit with two 40-watt lamps are available. Both can be furnished for either 50 or 60 cycle current and are high power factor to eliminate flicker, according to the manufacturer.

Voltage Stabilizer (312)

General Electric Co. has designed a new voltage stabilizer providing a constant output of 115 volts from circuits varying between 95 and 130 volts.

According to the manufacturer, this stabilizer is insensitive to load power factor, and is not affected by variations from no load to full load or by changes in power factor from unity to 0.8 lagging. It is said to be completely self-protecting and to operate continuously throughout the range from open circuit to short circuit without damage. Available in ratings from 50 to 5,000 va.

Small Wattage Flood (313)

Pittsburgh Reflector Co., has announced the new Permaflector enclosed small wattage floodlight No. ST-200 as a companion to the larger wattage ST Series units. This new unit is designed to take only the medium base 200-watt incandescent lamp. It consists of a formed sheet steel housing equipped with a silver mirrored glass Permaflector, convex heat-resisting cover glass, gasket, removable lens frame with clamp,

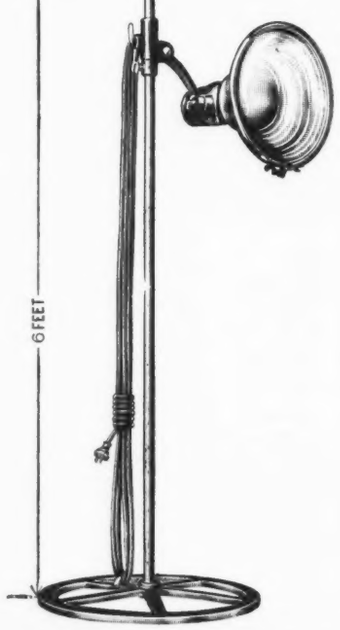
porcelain socket, adjustable bracket and base and corrosion-resistant, weatherproof cord grip fitting.

Carrier (314)

A device designed to handle a column of self-nesting boxes of finished parts, scrap, castings and similar materials has been announced by Ernst Carrier Sales Co. A built-in wedge at the bottom of the lift post slides under the stack eliminating the use of a skid. The stack of boxes is raised from the floor by leaning on the handle, which automatically locks when it reaches the horizontal position. Rated capacity of the carrier is 1,500 lb.

Adjustable Floodlight (315)

Steber Mfg. Co. is offering a portable floodlight assembly which is adjustable in a vertical range from bottom to top of the six-foot pipe standard at any angle horizontally and at 360° radius. Circular base is of cast iron and is 20-in. in diameter. Either 300 or 500-watt lamps can be used and clear convex or stippled convex diffusing heat-resistant lenses are available, the manufacturer states. The 12-in.-reflector is chromium plated.



ONE UNIT · ONE ORDER · ONE SHIPMENT · ONE INSTALLATION

one

NEW LIGHT-DUTY CSP POWER TRANSFORMER REPLACES 43 SEPARATE PIECES OF EQUIPMENT

This complete factory-packaged substation is first choice for industrial service.

Its compactness and portability permit installation nearer the load center. This improves voltage regulation . . . and saves on copper runs.

The CSP Power Transformer performs all the functions of a conventional substation . . . it occupies less than one-third the space . . . and is better looking.

CSP (Completely Self-Protecting) means:

(1) Three-point protection against lightning.

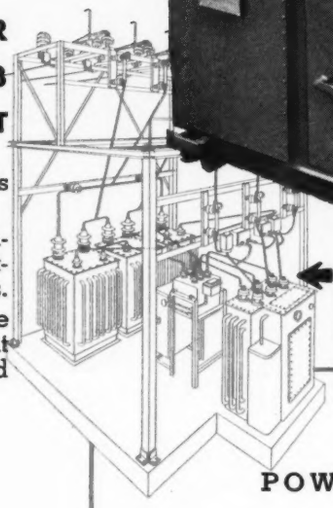
(2) Automatic protection against short circuits.

(3) Thermal protection against dangerous overloads. (Loading by Copper Temperature.)

All the thermal capacity of the transformer is made available, SAFELY . . . ideal for short-time overloads . . . conserves Critical Materials.

Ratings: 300—1000 kv-a; 50,000 kv-a breaker; 13,200—33,000 volts primary; 4160 volts secondary.

For complete information, call your Westinghouse Office or write for Descriptive Data 48-150, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., Dept. 7-N. J-70402



CONVENTIONAL SUBSTATION—with 43 components, takes up more than three times the space required by the new CSP Power Transformer.

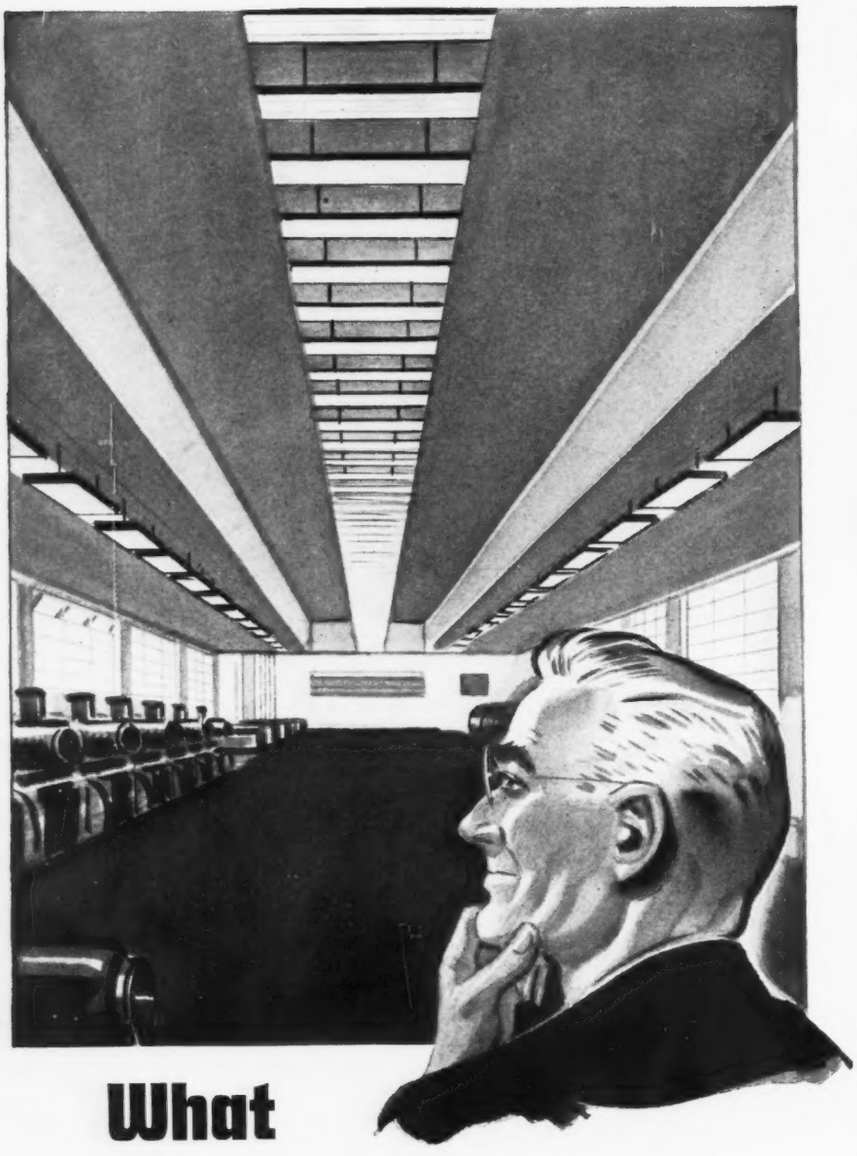
THE CSP LIGHT-DUTY POWER TRANSFORMER:

- **Saves man-hours**—simplifies ordering, installation and maintenance.
- **Saves space**—occupies less than one-third the space of a conventional substation.
- **Saves materials**—smaller and lighter than conventional substation. Hipersil* cores save electrical steel.
- Is completely protected against burnouts.
- Is completely protected against lightning.
- Is easily moved.

* Registered trade-mark, Westinghouse Electric & Manufacturing Co., for HIgh PERmeability SILicon steel which carries ⅓ more flux.

Westinghouse

PLANTS IN 25 CITIES... OFFICES EVERYWHERE



What started all this, anyway?

Well—don't think we're kidding—but a Starter started it. And the odds are that it was a G-E Starter.

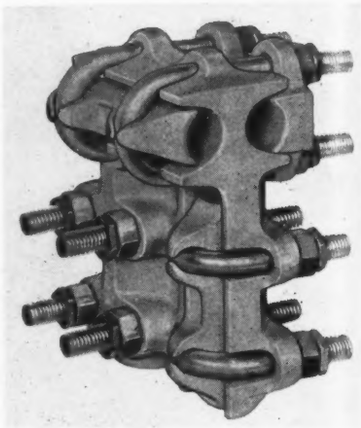
Why? Well, mainly because most fluorescent lighting users know by now that G-E Starters have the correct starting characteristics to make lamps last longer . . . to cut costs in lamp operation.

G-E Starters are designed by MAZDA lamp engineers and the timing in the Starter is *exact*. That means there is no needless waste of emission material (vital to long lamp life) when you use G-E Starters.

FOR COMPLETE INFORMATION on better fluorescent accessories for every fixture, write to Section G-332-18, Appliance and Merchandise Department, Bridgeport, Conn.

GENERAL ELECTRIC

Solderless Cable Fittings (316)



Delta-Star Electric Co. has announced high-compression solderless cable fittings for connecting and terminating multiple cables. These fittings are available in tees, straight connectors and cable to flat bars or tubing types. Illustrated is a tee connector for two 500,000 cm. cables on both main and tap. All standard cable sizes can be accommodated up to 1,000,000 cm.

Fiber Conduit (317)

Brown Co. is manufacturing a wood cellulose fiber conduit called Bermico, which it claims is made 100% from non-critical materials. Used previously for installation of electrical cables, the manufacturer states that lately this conduit has been used in place of critical metal conduit and for inside drain pipe to carry off rain water. It also is being used as a protective jacket to prolong the life of metal pipe exposed to corrosive action of liquids or gases, according to the manufacturer.

Non-Metallic Pipe (318)

A line of non-metallic drain and sewer pipe has been developed by the Fibre Conduit Co. This pipe is said to be resistant to moisture, tuberculation, corrosion and most dilute inorganic acids and alkalies. According to the manufacturer, it is durable, light and easy to handle and can be cut to desired lengths with an ordinary woodworking saw. Couplings maintain pipe lengths in line and provide tight joints if desired. Two types are available, perforated and non-perforated.

Electrode Holder (319)

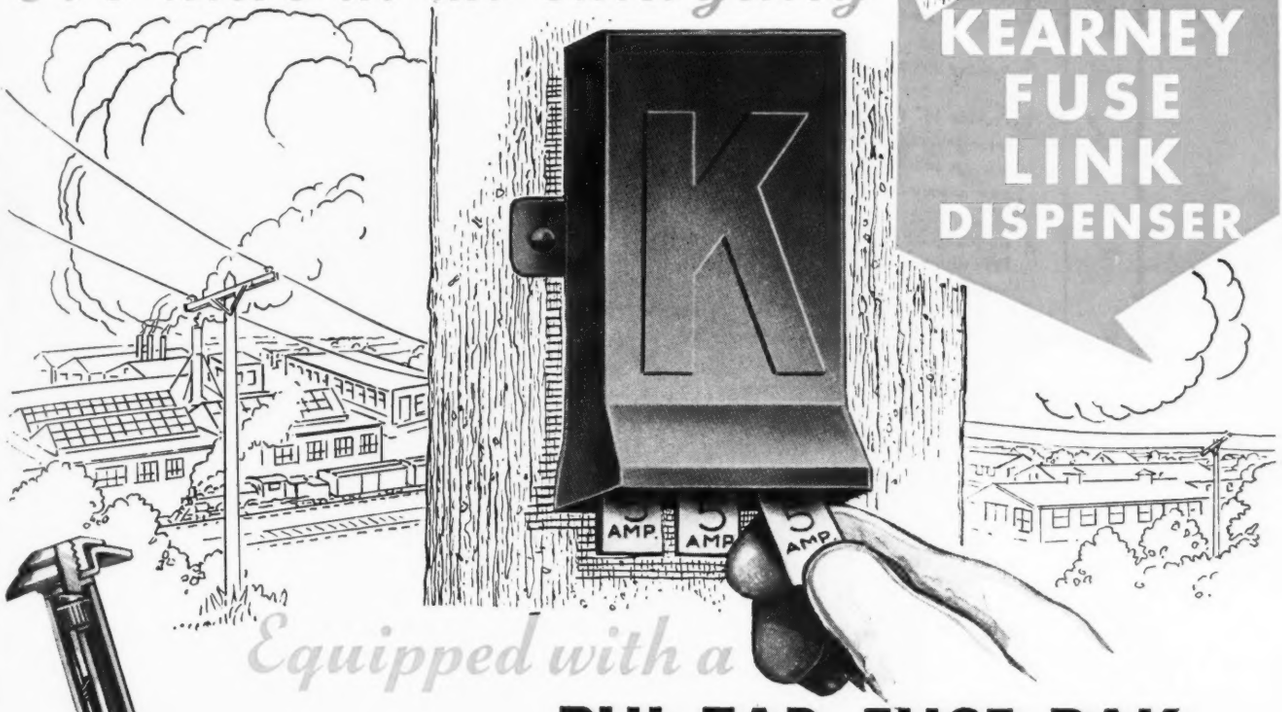
Jackson Products is offering an arc welding electrode holder which it claims is light, slender and easily handled. This holder is made of high-conductivity copper alloy and has a rated capacity of 200 amp. It takes rods from the smallest up to 3/16 in. Overall length 7⅞ in.; weight 12 oz. The holder has mechanical or solder cable connection, is insulated to protect the welder's eyes against flash and eliminate work spoilage.

Power Connector (320)

A new power connector has been announced by the O. Z. Electrical Mfg. Co. This fitting is made with two or three wire branch taps and takes a wide range of wire sizes, according to the manufacturer.

It's there in an Emergency

The KEARNEY FUSE LINK DISPENSER



Equipped with a

PUL-TAB FUSE-PAK of KEARNEY FUSE LINKS

Note above, the Pul-Tab Fuse Pak with clearly identified links. And note, too, the handy five-Pak, twenty-five link carton.

Operating men, particularly those responsible for the flow of power into our vital war industries—Army, Navy, Air Corps, and Navy projects—have been quick to see the advantages of having—the right fuse link, at the right place, at the right time.

And when you install Kearney No. 12165 Fuse Link Dispensers equipped with Pul-Tab Fuse-Paks on the poles at important locations—you're ready for emergencies with extra and proper fuse links which come in the handy Kearney Pul-Tab Fuse-Pak. You'll find these dispensing boxes handy, too, mounted in trouble trucks—with various rated links, ready for emergencies.

Precision-Built FUSE LINKS

Recognizing the urgent necessity of providing fuse links which will avoid unnecessary outages on lines protected with modern Fuse Switches and Cutouts, the Kearney Corporation offers a line of improved fuse links that have accurate, low temperature, pure tin fuseable elements, which carry normal loads safely and likewise isolate faults promptly. Thus, operating men throughout the country are using these dual-purpose links in Kearney Trip Out, Trip-O-Matic and Trip-Saver Switches and in other conventional cutouts, too.

Really, since they cost no more, take advantage of the protection which these Kearney precision-built fuse links provide . . . And remember, they come packed in handy Pul-Tab Fuse Paks, 5 links to a Pak. Each link is in an individual bag with amperage rating clearly printed on the "pul-tab." Standard square cartons contain 5 Fuse-Paks, a total of 25 fuse links. Order No. 12165 boxes and Fuse Paks now for emergency advantages.

JAMES R. KEARNEY CORPORATION — **4236 CLAYTON AVE., ST. LOUIS, MO.**

The Mark of Quality Products

Use This Check List

WHEN INSTALLING BRUSHES ON YOUR ELECTRICAL EQUIPMENT

1. See that all terminals are securely fastened to the brush holder support.
2. Remove dirt and grit from brush holders.
3. Provide ⅛" to $\frac{3}{16}$" clearance between commutator and nearest portion of brush support in reaction and box type brush holders. Less clearance is sometimes preferable on small motors.
4. Keep angular position of all brush holders uniform with respect to the commutator.
5. Check neutral point and space the brush arms equidistant about the commutator.
6. See that toes of all brushes on each arm are parallel with commutator segment.
7. To prevent streaking of commutator, stagger brushes in positive and negative pairs.
8. Seat new brushes on commutators and rings accurately with sandpaper or a brush seating stone.
9. Adjust brush spring pressure to conform with manufacturer's recommendation.

Care exercised in the installation, fitting and adjustment of brushes increases life, improves performance and eliminates many of the possible causes of interrupted service.

NATIONAL TRADE-MARK *Carbon, Graphite and Metal-Graphite* BRUSHES

"National" brushes are doing their full share of carrying the enormous load demanded by the Nation's war effort. Essential requirements must be met first. Every effort is being made to satisfy all demands for our brushes in the shortest possible time.

Proper maintenance is paramount in keeping your electrical equipment operating at full efficiency. Many valuable and time saving suggestions as well as details of operations mentioned in the above check list are included in this series of "Modern Pyramids" bulletins. Copies are available promptly upon request.

NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide and Carbon Corporation

UCC

CARBON SALES DIVISION, CLEVELAND, OHIO

General Offices: 30 East 42nd St., New York, N. Y.

Branch Sales Offices: New York, Pittsburgh, Chicago, St. Louis, San Francisco

LET'S GO! U.S.A. KEEP 'EM FLYING!

THE WORD "NATIONAL" AND THE SYMBOL ARE REGISTERED TRADE-MARKS OF NATIONAL CARBON COMPANY, INC.

SIMPLEX...

Insulated Wires and Cables must conform to war-time regulations now and "for the duration" but they retain the properties necessary for satisfactory service.

Into them we are putting the accumulated "know-how" of nearly sixty years devoted exclusively to making wires and cables with rubber, varnished cambric, impregnated paper and plastic insulations.

Shortages of many of the materials normally used in insulated wires and cables have seriously upset production schedules but expert use of what is available is breaking production bottlenecks caused by restrictions designed to conserve and control "critical materials."

The background of knowledge and skill built up during more than a half century now enables us to make the most of the limited materials we can get.

If you are doing essential, high priority war work and must have new cables we shall be glad to tell you more about Simplex cables and what they can do for you.

Simplex Wire & Cable Co., 79 Sidney Street, Cambridge, Mass.

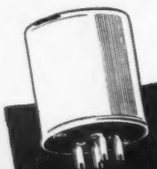
Simplex

WIRES and CABLES

ENGINEERED TO LICK SEVERE **Heat** AND **Humidity** PROBLEMS

Thermador Transformers are Thermatite treated to withstand extreme temperatures and humidity—arid or moist heat—dry or damp cold do not hamper their efficiency. Thermatite is the name of a process of accurate heat controlled vacuum impregnation developed and improved over a period of ten years.

THERMADOR
THERMATITE TREATED
TRANSFORMER



THE THERMADOR TRANSFORMER LINE

Included in the Thermador Transformer line are audio, auto, geophysical, bias supply, bridging, cathode modulation, coupling, driver, field supply, filament, high fidelity audio, input, midget plug-in audio, mixing and matching, modulation, output, plate, power, television, and tube-to-line transformers. Filters, chokes, and reactors.

Thermador Elec. Mfg. Co.
5119 South Riverside Drive
Los Angeles, California

"Seven Leagues Ahead"

BULLETINS

data books, etc.

Lamp Schedule (321)

A government manual and price schedule covering Birdseye lamps is being distributed by Birdseye Electric Corp. to government procurement agencies, purchasing personnel and government lighting engineers.

This lighting handbook analyzes the five main types of lighting requirements and pictures Birdseye installations for various purposes. In addition to information on Birdseye lamps standardized for government use on the 1943 contract, the schedule describes two lamp products—the Superlite light conditioning bulb for use without fixtures, globes or shades where such equipment cannot be secured, and infrared heat lamps for speeding up production in industrial baking, drying and dehydrating.

A similar schedule has been prepared for Wabash photographic lamps, giving information on flash lamps, exposure data, etc.

Circuit Breakers (322)

Westinghouse Electric & Mfg. Co. describes its line of Nofuze "De-ion" circuit breakers in a 40-page booklet recently released. These breakers are for lighting, distribution and power circuits up to 600 amp., and are available for panelboards, switchboards, built-in applications, individual mountings and separate enclosures.

Principles of the "De-ion" arc quenching action are explained and quick facts are given on design and operation of each breaker.

Special attachments are described, including the shunt trip, undervoltage release, auxiliary switches and bell-alarm switches. Diagrams and exact dimensions of each breaker are included.

Aluminum Welding, Brazing (323)

Welding and Brazing Alcoa Aluminum, a 100-page spiral bound booklet issued by Aluminum Company of America, tells how to use and work the metal correctly. Purpose of this publication is to speed up vital production, eliminate waste and scrap losses, and reduce tool breakage.

The booklet is well illustrated and includes two color pages dealing with flame adjustment. Covered in the several sections of the booklet are gas welding, arc welding, electric-resistance welding and brazing.

Fluorescent Maintenance (324)

A pocket-size pamphlet titled "Timely Wartime Tips on Fluorescent Maintenance" is being distributed by Sylvania Electric Products, Inc. This booklet outlines the setting up of a regular maintenance routine; tells how to test and when to replace equipment; gives a mortality curve for fluorescent lamps and shows how to figure the number of lamp replacements per month; lists factors that affect performance and life; and gives steps to follow in a checking system. Figures on improper maintenance are given to show that a well-designed but poorly maintained lighting system might give less than one-half the light paid for.

Centrifugal Pump Care (325)

Another in its series of maintenance handbooks—wartime care of centrifugal pumps—has been published by Allis-Chalmers Mfg. Co. This manual applies to all makes of pumps. It tells the steps in pump construction and how they affect pump maintenance. It explains how to figure head and gives tables of losses in piping, valves, fittings.

Other information includes how a change in liquid can "blitz" a pump; easy ways to find leaks; common mistakes in packing stuffing boxes; how to protect pumps against cavitation; the vital role of water as a lubricant in pumps, quick diagnosis of pump ills.

Hand Tachometers (326)

Herman H. Sticht Co. has issued a four-page bulletin describing its Model J single range hand tachometers which are designed primarily for heavy duty service. These tachometers are of the centrifugal mechanical type and indicate speeds and changes of speeds of any revolving shaft or surface continuously and instantaneously, according to the manufacturer.

Magnet Wire (327)

Formex magnet wire is the subject of a 27-page bulletin released by General Electric. Sections in the illustrated booklet tell the development and properties of Formex; advantages; types available; application; and give data tables.

ELECTRICAL WEST, 68 Post St., San Francisco, California

Please send me information about following CIRCLED items:

300	301	302	303	304	305	306	307	308	309
310	311	312	313	314	315	316	317	318	319
320	321	322	323	324	325	326	327		

Name..... Company*..... Title*.....

Address .....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

burned out motor

back on the job in 22 hours

BURNED-OUT MOTOR OF SPECIAL DESIGN RECEIVED 5:00 P. M. AT WESTINGHOUSE DISTRICT MANUFACTURING AND REPAIR PLANT. REPLACEMENT IMPOSSIBLE TO OBTAIN. MOTOR STRIPPED, REWOUND. STATOR DIPPED, BAKED, ASSEMBLED AND TESTED. DELIVERED TO USER FOLLOWING DAY, 3:00 P. M.—22 HOURS AFTER BREAKDOWN.

Westinghouse

DISTRICT MANUFACTURING AND REPAIR

J-90468

***IF* THE EQUIPMENT NEEDING REPAIR IS VITAL TO THE WAR EFFORT . . . PHONE THE NEAREST OFFICE OF WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY FOR**

EMERGENCY SERVICE

33 M & R PLANTS . . . ONE NEAR YOU!

ELECTRA'S HUSBAND

Impasse on the Labor Front

"DID I tell you about our new office boy?" I asked Electra while wiping the dishes one evening after dinner. "Our fifteen-year old Oklahoma cowboy quit and went back home. California cities didn't appeal to him as much as the thoughts of riding a horse on his home range."

"What have you got now, a girl?" Electra queried.

"No, the manpower shortage hit us harder than that. You can't get either girls or boys. So Jim Jones' oldest kid comes in after school and works until five thirty. He's all right too. Jim used to bring him over Saturday mornings when he was a little sprout, so he learned to shave cylinders and run the mailing machine. But he's a real economic royalist now. Maybe your psychological education can explain him."

"He hasn't got union ideas has he?" Electra asked.

"Oh no, just the opposite," I said. "He's an employer, or would be if his young brother Bill would cooperate. You see the Jones' maid quit and went to work in the shipyards, so the two boys have work assignments around home now. On alternate nights one has to set and clear the table and help with the dishes. They don't get paid. It's just their contribution to wartime conditions in the Jones' home."

"Good idea," Electra mused. "Now why shouldn't I put something like that into effect?"

"Skip it, and let me finish my story," I said. "Jack gets home late now. Besides he has money. So he proposes to Bill that he take over the work on the home front every night. They strike a bargain. Bill does Jack's work for five cents a night."

"That wasn't a bargain," Electra cut in. "It was robbery."

"So Jack found out," I said. "About the third night Bill struck. His proposal was ten cents a night or no soap. Jack could do the work himself. Now here is where the psychology comes into the picture. Fifteen and eleven and locked in one of the tightest labor arguments as ever closed up an industrial plant. Jack shows all of the characteristics of the most reactionary industrialist. He offered six cents. Bill held out for ten. So Jack takes over on his nights, thinking Bill will break down."

"Knowing him, I'd say he wouldn't," Electra said.

"You're right. Then Jack raised his offer. Seven cents. Bill was adamant. Ten cents or nothing. As a final compromise Jack countered with his best proposition—seven and a half cents a night, or fifteen cents for every two nights Bill worked for him. In telling me about it, Jack said in true reactionary language, 'I'll see him in hell before I'll give him another cent.' So you have a lockout.

"There, my dear, you have the elemental steps leading up to almost any labor trouble. Shorn of all the union agents, labor relations specialists, government intermediaries, non-partisan boards and Wagner act amendments, is inherent labor strife. But you'll have to explain it."

"You can't explain it," Electra said. "It's as old as man. You can only rationalize it. A man or a group gets power or money and another wants to share it."

"I've seen it in business," I said. "Take an electrician who has worked with the tools for a long time. Then he goes into the contracting business for himself. Thus he becomes an employer of labor. His whole point of view changes immediately. That kind is the toughest to reason with on employer-employee relations."

"Getting back to the Jones' kids," Electra said. "their dad can't lick them. Nor can their mother legislate a settlement. They'll have to work it out for themselves. Only mutual respect and understanding will do it."

FULTON LEWIS, JR. isn't responsible for this bit of information. Electra found it in a copy of *Printers' Ink* I brought home one evening. During December official government cars in Washington, D. C., burned up 44,868 gallons of gasoline. That was exclusive of Army and Navy vehicles. The amount used was 15% greater than in the previous December. Great stuff, gas rationing.

WHILE on the subject of Fulton Lewis, the experience of the manager of a utility in one of the Coast areas where war industry developments have doubled load, population, customers and troubles is worthy of notice. This manager has his trouble with bureaucrats—little bureaucrats appointed to fill local and regional jobs. Sometimes they get him down with their rules or, more often, their failure to rule. So he has developed a formula that thus far has brought action. When everything comes to a stalemate, he announces that he is going to write a letter to Fulton Lewis, giving him the whole story. Then things happen.

ELECTRA heard Captain Eddie Rickenbacker speak over the radio from Los Angeles last month and pestered me so much about getting a copy of his speech that I finally did so. It was worth while just for one uplifting section. Here it is:

"Realize that we have in the past several years spent billions of dollars to destroy self-reliance, initiative, imagination and individuality, trying to plan the lives of 130,000,000 people by a superior few. Now we are spending billions to re-create self-reliance, initiative, imagination and individuality.

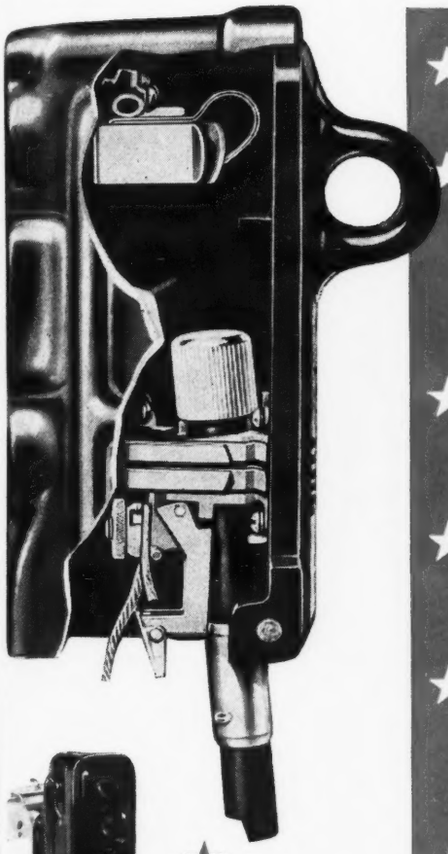
"For once you place our boys in a fox-hole in the jungles of the Pacific, or in the desert sands of Africa, they are on their own. Once you have ordered our boys as commando troops to attack the enemy at night, they are on their own. Once you have dropped parachute troops behind enemy lines, night or day, they are on their own. Once you place a man in the cockpit of a plane and send him into the blue above, he is on his own. Once you put our boys into the tanks against the enemy, they are on their own.

"And when you put an officer into the front line, leading a group of our boys into the face of enemy fire, he is on his own.

"It is imagination, individuality, self-reliance and initiative that are going to win this war for America—not only on the field of battle, but on the home front.

"For bear in mind, that when this war is over—pray God it will be soon—there will be more rugged individualists come back to America from the far corners of the world than we ever had at any one time in our history, and I thank God for that."

HERE ARE THE REASONS WHY YOU FIND THE L-M "PVD" FUSE CUTOUT ON SO MANY LINES



Only the L-M PVD has all these important features that you want in a modern fuse cutout. That is the reason why there are so many PVD's in use today.

FOUR SIZES

5000 V, 50 A	No. C-230016-6
7500/12500 V, 50 A	No. C-230004-6
5000 V, 100 A	No. C-230029-6
7500/12500 V, 100 A	No. C-230005-6

★ **always protected** The PVD door is always closed, internal parts are always protected from the elements.

★ **unfailing operation** Because the operation of the PVD is independent of any door movement and because all working parts are fully protected, the PVD operates as a disconnecting or dropout cutout *at all times.* Cartridges will always be out of circuit when link has blown.

★ **spots trouble** The tell-tale position of the dropped down cartridge is readily visible from any direction and from distance—spots the trouble quickly and saves hunting.

★ **safe, cool contacts** Positive, heavy contacts and large contact surfaces, elimination of intermediate current carrying parts in circuit path, keep operating temperatures of PVD low.

★ **arc quickly cleared** When link blows, a flip-out device pulls the link apart and out of the cartridge. Arc is positively extinguished before any contacts move or separate. A large airgap between contacts prevents any re-establishing of the arc.

★ **easily, quickly re-fused** Outages are quickly restored. The PVD can be re-fused in one minute—a safe, easy operation right on the pole, even with gloved hands.

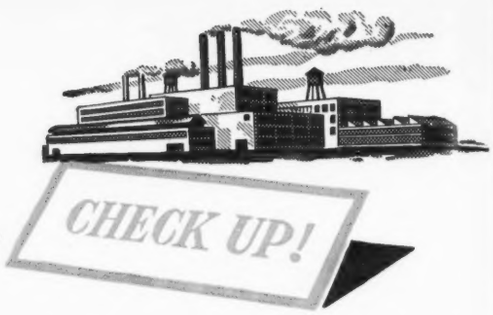
1 Bakelite door of PVD lifts off dead hinge in one easy movement. Fuse cartridge cap is easily unscrewed and removal of blown link is a matter of seconds.

2 New fuse link slides into and through PVD cartridge without a hitch. It is only necessary to replace cartridge cap.

3 In a matter of seconds, the new link is pulled over the flip-out device and fastened with the knurled nut.

4 Door is hooked onto hinge and swung shut in one continuous, easy movement. Entire re-fusing operation can be done without any tools in sixty seconds.

LINE MATERIAL COMPANY



Electrical failure somewhere in your plant may be more imminent than you think . . . .

WARTIME restrictions make copper products hard to get—this includes electrical wire and cable. It will pay you to protect what you have.

Anaconda's Preventive Maintenance Plan will help you check to see that cables in your plant are not being abused . . . to detect electrical weaknesses that can be corrected.

If you follow this free plan you not only help yourself, but more important, you help the war effort. This manual provides a practical automatic method for complete analysis of circuits and equipment...uncovers potential weaknesses . . . methods for correcting them . . . with charts to enable quick periodic check-ups. 43222

NOTE: Through this Preventive Maintenance Plan you may uncover the evidence necessary to obtain an "emergency repair priority." This is explained fully in the plan book.

"Tomorrow may be too late . . . do it today!"

ANACONDA'S PREVENTIVE MAINTENANCE PLAN

ANACONDA

Anaconda Wire & Cable Company
25 Broadway, New York City

Please send copy of the Anaconda Preventive Maintenance Plan for safeguarding production.

Individual.....

Company.....

Address.....City.....

3K

ELECTRICAL WEST

MARCH, 1943
VOL. 90 NO. 3

Employee Participation in Management

Conference discussion of company policy by entire staff would include individual employee in coalition of labor and management

Alfred M. Cooper

Alfred M. Cooper has been a utility employee, serving as engineer, supervisor, educational director. He is lecturer and author of three books on public relations and employee training.

LIKE everything else in this world the relationship of management and labor appears to travel through cycles. We are just completing one rather unpleasant phase of such a cycle, and apparently are about to enter on another phase. Whether or not the experiences that lie just ahead are to be pleasant and profitable depends on whether we have learned anything from our past mistakes. It is especially important right now that the management of a public utility corporation give intelligent consideration to industrial relations problems.

It is a fact that the power company stands to lose more when friction exists between management and labor than is the case when the industrial relations of another type of corporation are involved. This is true because the industrial relations of the utility company are so closely tied in with the ownership question.

In the past decade we have seen what happens when opportunistic politicians are permitted to take advantage of any schism existing between management and labor. The experience has not been a pleasant one, and in the long run such political interference harms labor as much as it does private enterprise in general. Therefore it would seem the smart thing to do for management to set up at this time something new in the way of an industrial relations program—a program that will obviate any further opportunity for governmental interference in the conduct of a utility's internal affairs.

It should be obvious that something new must be added to our old-fashioned methods of meeting industrial relations problems. We need much more than the old employee-welfare-company-union type of activity in dealing with our employees. We know now that these things lead, not to any permanent condition of mutual harmonious effort, but only to recurrent periods of political and economic upset.

The new element that is needed in the industrial relations of the privately owned utility is employee participation in affairs of management. And by this I mean that each individual employee must be given an opportunity to express his opinion on all important matters of company policy.

Something approximating what I have in mind is now being tried out in the labor-management committees that have been organized in certain of our war industries. These committees, however, are in no sense a real answer to the problem of securing employee participation in management. The labor-management committee will fail in attaining its goal for two reasons. The first of these is that the labor half of such a committee is controlled largely by an outside influence—the leadership of the organized labor movement. The second reason is that the committee idea doesn't go far enough to include the individual employee in the new coalition of labor and management.

By now we have traveled far enough along the road to the solution of our industrial relations problem to appreciate that there will never be any labor peace in America until management and the working force get together without interference from any third agency. Furthermore, we should understand by now that many of our troubles with employees have resulted from a misguided managerial policy on labor questions—a policy that has been just as opportunistic in nature as the actions of those politicians who fatten at the expense of both management and labor.

There has been but one time in the history of the power industry when we had no industrial relations problem. This halcyon period occurred in the very early days of the industry when everybody from the manager down was trying to discover ways and means of keeping the experimental machines and equipment of that day in service for 24 hours at a time. In those days there was no labor problem because there was no real distinction between management and labor. The employee who could rewind an armature was far more indispensable to the welfare of the company than any official of that company. The problem of maintaining continuity of service overshadowed all else, and every employee was engrossed in his job and felt a deep sense of responsibility for the success of his company.

Since that time improvements in equipment and the inevitable changes that come with the expansion of any industry have operated to take from the employee all sense of responsibility beyond the little that is inherent in his own job. Somewhere along the line, management allotted to itself all the really interesting, creative jobs and left the worker with the rather uninteresting, routine work of operation and maintenance. For 40 years now, all industrial relations activity has had for its object keeping intelligent men and women satisfied on jobs that offered little opportunity for a display of intelligent initiative. As universal education increased the workers' capacity for thinking, jobs

became increasingly automatic and required less and less thinking. It is this fact, and the natural resentment of the worker occasioned by this situation, that have opened a schism in the relationship between management and employee which permits outside influences to profit at the expense of both.

It is a surprising fact that, in this matter of employee participation in management, the publicly-owned electric utility is far ahead of the privately-owned company. This superiority is in no sense due to the farsightedness of the management of the city power bureau. It is something that just happens to exist. It is an outgrowth of the years in which these city-owned utilities were very much the underdog in the electric power field, during which time there grew up a strong feeling of interdependence between employees and management.

This situation is best exemplified when the employees of a city power bureau participate in an ownership election campaign. At such a time it is obvious that the employees (all of them) are fighting their bureau's battle, and management has only a minor role in the affair. The employees may even put up the money for the campaign, and every one of them works night and day to win that election. I have seldom seen anything approximating this cooperative spirit among the employees of a privately-owned utility.

Because of the peculiarly vulnerable position of the power company, due to the constant threat of public ownership, it behooves the management of such a company to make every effort to secure 100% cooperation from its employees at all times. It may well be that the entire ownership question eventually will be determined by the attitude of the private utilities' employees in this matter. Anything that will increase the feeling of responsibility possessed by these employees will improve this attitude.

There may be a number of excellent methods by which employee participation in affairs of management may be increased. I would like to submit my own suggestion for a set-up which, if honestly installed, will achieve this purpose. If the suggestion is not peremptorily discarded it may be that this idea, or some variation of it, may be the answer to this problem.

I have said that I do not favor any plan that operates through a committee of any sort. I have found that when a committee is appointed the tendency of all of us is to pass the buck to the members of that committee and forget the whole matter. A labor-management committee will not get the results we are after.

Instead of organizing such a committee, management should rather set up an arrangement whereby all important matters of company policy would be discussed in conferences participated in by every employee of the company. These conferences would not occur at regular intervals, but would be called only when questions vital to the welfare of the entire organization were to be settled. The employees would meet in groups of 20 or 30, and in each conference discussion would be conducted by the immediate supervisor of the employees. In these conferences *all* of the facts regarding the particular managerial problem under consideration would be put before the various groups, and after threshing out this problem each group would arrive at a definite conclusion regarding the solution. *The consensus arrived at by a majority of all employees would be final, and this decision could not be reversed by management.*

Such a conference set-up is neither expensive nor difficult to install. I have used it repeatedly in directing employee activities in ownership election campaigns. It is only necessary that the supervisors who lead the employee conferences receive sufficient training in conference leadership to enable them to develop good group discussion. Your training supervisor can take care of this. The entire round of conferences (some 250 of these are required in an organization of 5,000) can be conducted in one week without interfering in any way with production.

It is essential that the decision of the employees in the matter under consideration be final. Any other situation would rob the entire program of any real meaning.

It should be further obvious that the employee consensus will at times show faulty judgment, particularly at first. In this respect, however, it will not differ greatly from management consensus, and once the employees discover that this is not just another one of those things, you will find that they will take their responsibility just as seriously as could any board of directors. When they see their ideas actually being carried into effect they will become meticulously conscientious in discharging this new responsibility of theirs. In my opinion there would be fewer mistakes in judgment made when 5,000 run-of-the-mill brains tackled a problem in policy than when a half-dozen superior brains made the decision.

The type of managerial problems that would be submitted to the employees for decision should readily suggest themselves to management. Once the program of employee participation has been properly established there should be no hesitancy in referring any problem in company policy to the employees. As a part of the problem put before the employees, recommendations of the engineering department on matters of purely technical import would be appended. Minor managerial decisions of a routine nature would continue to be made by management, but no important change in company policy would be made without the consent of a majority of the employees.

The company that encouraged *bona fide* employee participation in management could forget about all the older substitutes for securing employee cooperation. There would never again be any occasion for indulgence in paternalistic practices of any sort. The only motivation the employee needs would be supplied by his complete sense of responsibility for the success of his company. It is the lack of opportunity afforded the employee to exercise this sense of responsibility that has resulted in the use of subterfuge methods for improving industrial relations—methods that, as the record clearly indicates, have accomplished very little.

If the set-up I have suggested is adopted, it is essential that the employees be given all the facts on which their decision must be based. In this type of employee management there can be no star-chamber sessions. And above all, don't attempt to substitute a system of employee balloting in place of a program of conference discussion of these questions. It is only after thoughtful discussion that the employees can understand all the elements of the problem they are expected to solve. It should be unnecessary to add that the first time you reverse the considered joint opinion of the 5,000 employees, you destroy the confidence of the employees in your sincerity, and the program becomes worthless.

It would, of course, be well to begin such a program by submitting to the employees questions of less than revolutionary importance. Then, as the groups demonstrate their ability to solve these problems satisfactorily, they may later be entrusted with decisions involving most important questions of company policy. Eventually it may well be that the very existence of any privately-owned utility company may depend entirely on the degree to which management can secure the complete cooperation of every employee on the pay roll. At such a time it is comforting to know that the machinery to secure 100% employee cooperation is already in operation.

Power for the Southwest

New Bureau of Reclamation hydroelectric plant adds to supply for war industries—Station incorporates new turbine setting technique and high speed, quick response voltage regulation

L. N. McClellan
Chief Electrical Engineer, U. S. Bureau of Reclamation

ANOTHER of Uncle Sam's hydroelectric plants was placed in operation Dec. 13, 1942, and is now supplying power for the production of copper, magnesium, and other materials which are essential for the war program. This new power plant is located at a western dam which was built a few years ago by the Bureau of Reclamation. The principal purpose of the dam is to provide a desilting basin for municipal water supply to be taken out by a large aqueduct. It also serves to reduce the pumping head at the intake pumping plant on the aqueduct; provides flood control for flash floods; and creates a head of 30 ft. for power purposes.

The power plant is located on the west side of the river immediately downstream from the right abutment of the dam. A forebay provides a short approach channel from the lake created by the dam to the penstocks. A trashrack structure is provided at the entrance to the forebay. Trash accumulating in front of this structure will be removed by means of a crawler-type crane equipped with a clam shell bucket.

Four penstocks, one for each main generating unit, conduct water from the forebay to the turbines. Each penstock is provided with a fixed-wheel type of shut-off gate at the entrance. These gates are 22 ft. in width by 35 ft. in height and they are operated by a motor-driven gantry crane. In the raised position the gates are supported by mechanical latches.

The penstocks vary in length; the shortest is 126 ft. and the longest is 285 ft. The penstock tunnels were excavated to a minimum diameter of 27 ft. The steel penstocks are 22 ft. in diameter and are of welded construction. The plates vary in thickness from 5/8 in. to 5/16 in. Stiffener rings made of 1-in. by 8-in. bars spaced 2 ft. 6 in. are welded to the outside of the penstocks. The penstocks were fabricated at the site of the power plant. They are designed to withstand the full hydrostatic pressure without assistance from the surrounding rock. The space between the steel penstocks and the rock was filled with concrete and finally grouted under low pressure.

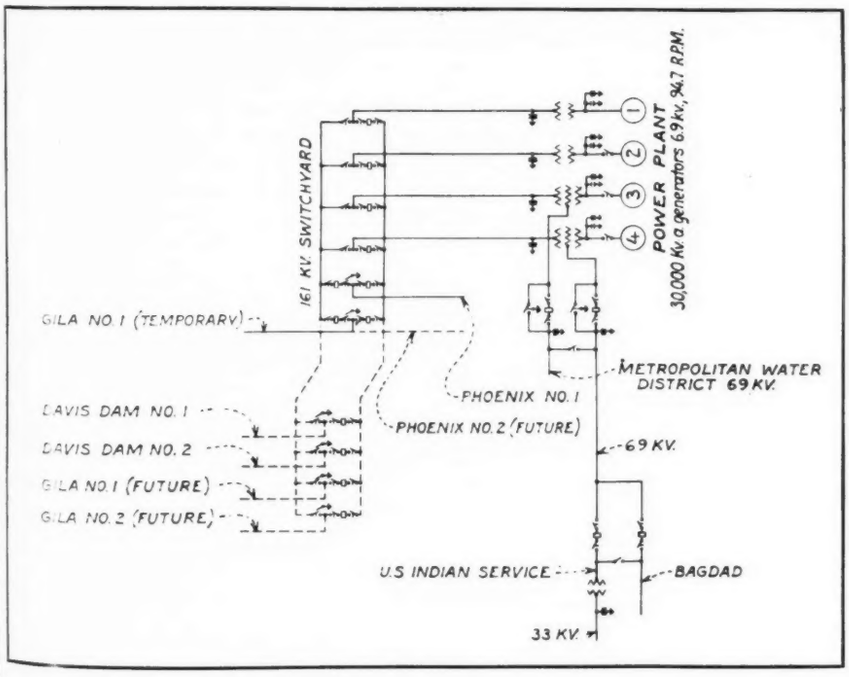


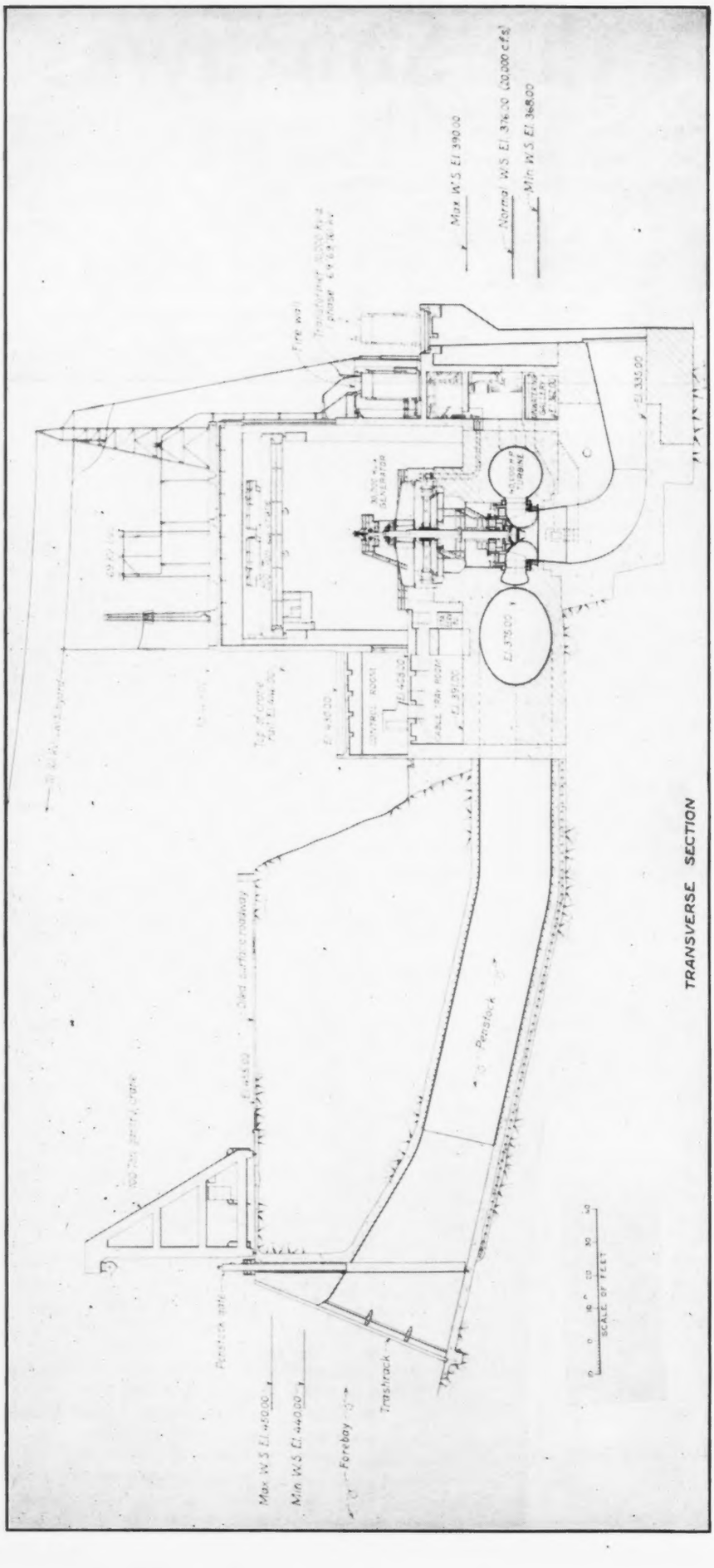
Fig. 1—Switching set-up of new plant showing outgoing transmission circuits

The turbines are of the vertical-shaft, reaction type with plate-steel spiral casings. Each turbine is rated at 40,000 hp. at 77-ft. head and operates at 94.7 rpm. The center line of the turbine is approximately at the normal elevation of water surface in the tailrace. This low setting was selected so as to minimize cavitation of the turbine runners and to provide for future lowering of the water surface in the tailrace due to scour of the river channel. The turbine runners are single piece steel castings. At full load and rated head each turbine will discharge approximately 5,000 sec.-ft. Fig. No. 2 shows a cross section of the power plant.

Turbine Installation

The Bureau of Reclamation has developed a special technique for installing large turbine casings which has proved quite satisfactory. The turbine casing is first completely assembled in place and supported by jacks. The casing inlet and the speed-ring openings are then closed by temporary bulkheads and the casing is filled with water which is maintained at a pressure equal to the normal operating pressure. This expands the casing to its normal shape and size. The casing is then accurately leveled by means of the jacks and holding down bolts and the concrete is then placed around it. The pressure is maintained in the casing while the concrete sets and sufficient cold water is circulated through the casing to remove the heat generated by the cement during the setting period. After the concrete surrounding the casing has set and shrunk to its final size the space between the casing and the concrete is filled with cement grout. This technique results in proper distribution of loading between the steel turbine casing and the surrounding concrete and eliminates overstressing and cracking of the concrete due to expansion of the turbine casing under water pressure.

The turbine guide bearings are of the babbitt-lined, forced-oil lubricated type. Duplicate oil pumps are provided for each bearing, the normal



oil supply pump is driven by an alternating-current motor, and the spare or emergency pump, which is arranged to start automatically upon failure of oil pressure, is driven by a direct-current motor supplied from the station storage battery. Each turbine is provided with two double acting servomotors which operate the turbine wicket gates. These servomotors operate with oil under a pressure of 250 to 300 lb. per sq. in. and they are designed to completely open or close the wicket gates in five seconds. The servomotors are equipped with special means for retarding the rate of closure from the speed-no-load position to the fully closed position to prevent excessive pressure rise in the turbine casing and penstock. An automatic valve operated by the gate shifting mechanism is provided to admit air into the draft tube at partial opening of the wicket gates.

The draft tubes are of the conventional elbow type with two intermediate piers in the horizontal section. Plate-steel, draft-tube liners extend approximately 16 ft. below the center line of the distributor. Stop logs are provided at the discharge end of the draft tubes for unwatering and inspection purposes.

Governors

The governors are of the oil-pressure actuator type. The speed-responsive element is driven by a small electric motor which receives its power supply from a small permanent magnet alternating-current generator direct-connected to the main turbine shaft. Each governor is provided with two motor-driven oil pumps, one of which is a stand-by for the other. The second pump is arranged to start automatically on failure of the other pump or upon reduced oil pressure in the accumulator tank. Remote control of the speed level and load limit is provided in the main control room. The actuators will close the turbine gates automatically upon overspeed or failure of the main generator windings.

Generators

The main generators are of the vertical-shaft, water-wheel type. Each generator is rated at 30,000 kva., at unity power factor, 6,900 volts, 3 phase, 60 cycles, 94.7 rpm. They are of the totally enclosed water-cooled type. The insulation is Class B or inorganic kind and the generator is rated on the basis of a temperature rise of 60° C. Each generator has two guide bear-

Fig. 2—Cross section through the new U.S. Bureau of Reclamation plant showing arrangement of turbines, generators, transformers and other equipment

ings, one above and one below the rotor, and a thrust bearing of the Kingsbury type located above the rotor. Each generator has a direct-connected exciter and pilot exciter mounted on the upper end of the main generator shaft.

The electrical characteristics of the generators are as follows:

(a) Unsaturated, direct-axis, transient reactance not more than 33%.

(b) Direct-axis synchronous reactance not more than 70%.

(c) Equivalent reactance not more than 53%.

(d) No-load, balanced, telephone-interference factor not more than 50%.

(e) No-load, residual, telephone-interference factor not more than 30%.

(f) Short-circuit ratio not less than 1.60%.

The flywheel effect of each generator is 50 million pounds at a radius of one foot. Each generator is equipped with an automatic carbon-dioxide, fire-protection system. Air-operated brakes capable of bringing the rotor to a stop from half speed in 7½ min. are provided, and the brakes may also be used as hydraulic jacks to lift the rotor off the thrust bearing. A hand-operated, high-pressure oil pump serves to operate the hydraulic jacks.

The excitation system is designed for a speed of response of not less than 0.5. The excitation voltage is 250. Each generator is provided with an automatic voltage regulator sensitive to changes of one-half of one per cent and which will respond in 0.05 sec. after the voltage has departed from normal.

Transformers

A separate bank of step-up power transformers is provided for each main generator. The transformers for banks No. 1 and 2 are two-winding type, while those for banks No. 3 and 4 are three-winding type with a 69-kv., full-capacity tertiary winding. The transformers are of the single-phase, water-cooled, inert gas type and are rated 10,000 kva., 6.8/161-kv. A transformer transfer car operating on a track along the transformer deck is provided for moving the transformers.

Powerhouse Crane

The main generator room of the power house has an overhead traveling crane equipped with two trolleys, each of which has a 135-ton main hoist and a 20-ton auxiliary hoist. The two main hoists are used together to lift the rotating parts of the generator by means of a special lifting beam. The bridge has a span of 59 ft. 6 in. and operates on a runway 330 ft. long. The operating speeds of the crane are as follows:

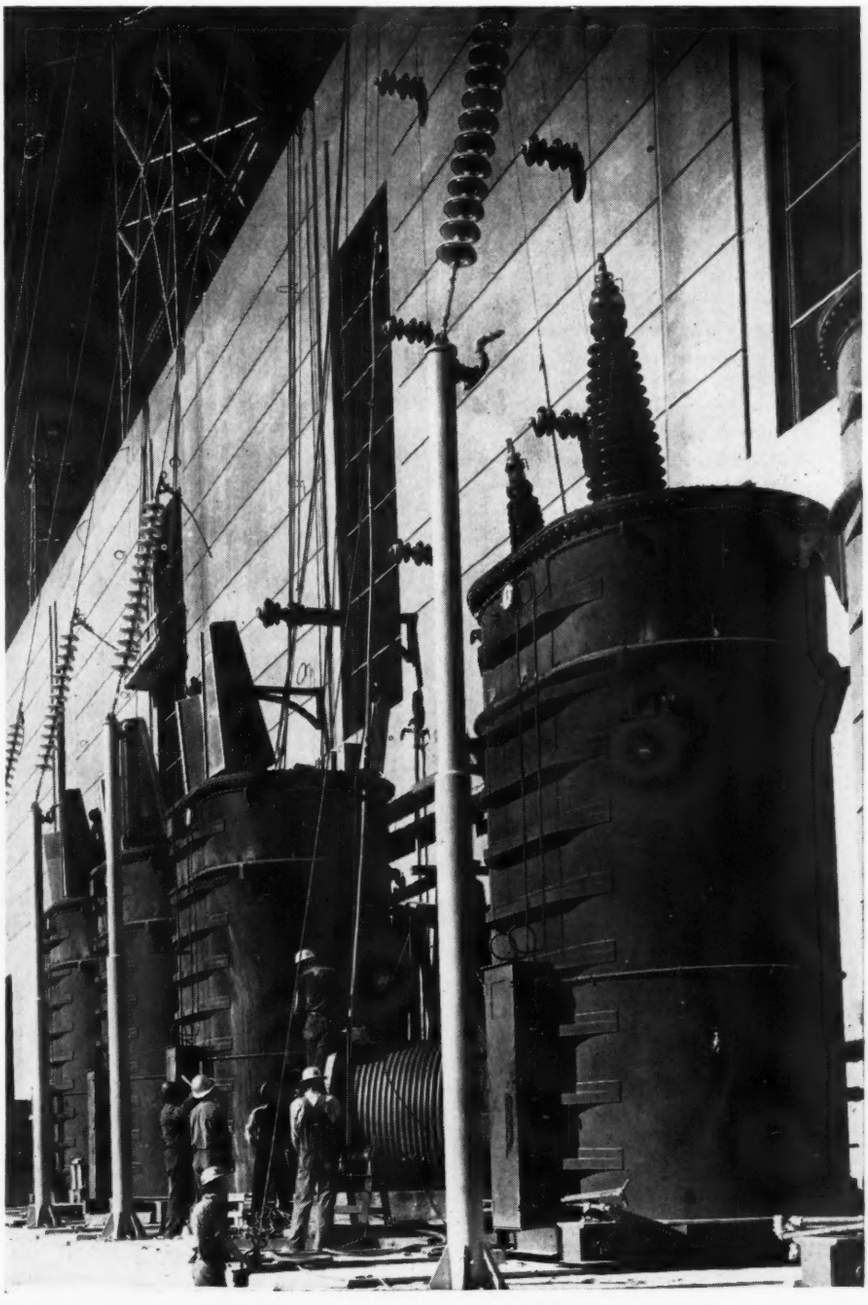
Main hook	4 ft. per min.
Auxiliary hook	25 ft. per min.
Trolley cross travel	20 ft. per min.
Bridge travel	90 ft. per min.

Switching Station

A 161-kv. switching station is located a short distance from the power plant. Each bank of step-up transformers is connected with this switching station by a separate overhead circuit. The switching station has two busses and the complement of oil circuit breakers and disconnecting switches permits various grouping of generating units and transmission circuits to suit different load conditions. The 161-kv. oil circuit breakers have an opening time of five cycles. The switching arrangement is shown in the accompanying drawing.

The power plant was designed under the author's direction and under the general direction of J. L. Savage, chief designing engineer of the Bureau of Reclamation. The engineering and construction work of the bureau is under the general direction of S. O. Harper, chief engineer, Bureau of Reclamation, with headquarters at Denver, Colo., and all activities of the bureau are under the general charge of John C. Page, Commissioner of Reclamation, Washington, D. C.

Single-phase, water-cooled transformers are rated 10,000 kva., 6.8/161-kv.



Wartime Transformer Loading

Recommended maximum loadings under normal and emergency operating conditions based upon ambient temperatures as formulated by AIEE*

Earl Baughn
Electrical Engineer, The Washington Water Power Co.

THE AMOUNT of load which an electrical machine may carry without damage has always been an important question among operating engineers. At the factory a name-plate is attached which specifies the ampere or kilovolt-ampere load. The operator, in time, through accident or necessity finds that nothing serious happens if the name-plate rating is exceeded. He then begins to wonder how much and for how long the name-plate rating may be exceeded without shortening the life of the apparatus. Also he wonders how much the life is shortened if the overload is so great that the insulation begins to smell.

A good many years ago an order was received by one of the larger electrical manufacturers for a 2.500-kw. steam turbine-driven generator with the specific requirement that it would carry 100% overload continuously without overheating. Naturally the manufacturer sold the customer a 5.000-kw. generator with a 2,500-kw. name-plate. If the present operator is loading this generator in accordance with the name-plate, he is not receiving the full benefit of the machine.

It has always been uneconomical to load a machine so that the maximum benefit is not obtained and, as a result, its life is extended beyond the point where it has become obsolete through age. Neither is it economical to overload and shorten the life. During the present war times it may be necessary intentionally to overload and shorten the life somewhat but, on the other hand, loads which might result in a quick failure are to be avoided.

During the last 10 or 15 years much testing and study of the aging of insulating fabric and paper tapes has been carried on in order to determine the effect of heat over a long period of time on the insulation of electrical machinery. These tests have of necessity been made on small pieces of insulating material and at high temperatures. From the results of these tests and observations of insulation in operating apparatus attempts have been made to predict by speculation the probable life of the insulation in electrical machinery when operated at lower temperatures over long periods of time. One well known engineer remarked recently that "despite all the tests that have been made on pieces of insulation and despite all the highbrow papers and articles that have been written, it still is a fact that we know very little about the effect of overloads on the useful life of electrical equipment."

Loading of Transformers and Regulators

Transformers and regulators are one class of apparatus which lends itself to loading by copper temperature rather than by name-plate. The manufacturer attaches a name-plate which states that the temperature rise will not exceed 55° C. over a 40° C. ambient when operated continuously at full rated load. No guarantee of life at this rated load and temperature is given. However, estimates varying from 1 1/3 to 7 years have been made by men who have carefully studied the subject. It is generally agreed that a transformer should not be operated at rated kva. continuously in an average daily ambient above 30° C. On the other hand, it is found that transformers which are operated under usual conditions as to ambient temperature and load factor and which do not exceed full rated load have a very long life of the insulation. The reason for this is that the ambient seldom reaches 40° C., the load factor is usually 50% to 75% and the rated load is not reached every day. Operating engineers have been taking advantage of these well known conditions and arbitrarily setting an allowable peak load well above the rating.

Due to these conditions and also due to the necessity of obtaining full use of transformers during the present emergency the transformer subcommittee of the American Institute of Electrical Engineers published an *Interim Report on Guides for Overloading Transformers and Voltage Regulators.* This report recommends that for modern-design transformers built since 1928 the continuous kilovolt-ampere loading may be increased one per cent for each degree that the daily average temperature is below 30° C. for self-cooled transformers, three-fourths of one per cent for each degree below 30° C. for forced-air-cooled transformers and one per cent for each degree below 25° C. for water-cooled transformers, down to 0° C. ambient. Similarly the loading should be decreased two per cent for each degree that the daily average ambient temperature is above these temperatures. For daily load factors below 100% the loading may be increased 0.3% for each per cent that the daily load factor is below 100% up to a maximum of 15% corresponding to 50% daily load factor. These two recommended increases are addative. A chart showing the recommended peak loads for a self-cooled transformer is shown in Fig. 1. Similar charts may be constructed for forced-air-cooled and for water-cooled transformers.

Published weather data for Spokane, Wash., were obtained and the daily average temperature for the year 1939 was plotted as shown on Fig. 2. This resulted in such a rough curve that it could not be used to calculate a permissible peak transformer load curve. The normal mean temperature curve was then plotted and found to be 10° C. below the daily mean at many points. The normal maximum temperature was found to be more nearly the temperature which should be used. Therefore the recommended peak load for Spokane and vicinity shown on Fig. 2 is based on the normal maximum temperature and the chart of Fig. 1.

The above rules and curves are for transformers rated on a 55° C. rise. In case the transformer is rated on some other rise or tests show a rise of more or less than 55° C. then the kva. for 55° C. should be calculated and used as the full load rating. In making these calculations it is assumed that the oil rise over the ambient varies as the 0.8 power of the total loss and that the copper rise varies as the 0.8 power of the copper loss for transformers with horizontal coils and

* Based on a discussion before the Spokane Section, AIEE.

Table I—Short-Time Emergency Overloads for Transformers Rated Above 500 kva.

Duration of Load-Hours	Self-Cooled and Water-Cooled		Forced-Air-Cooled	
	Following Full Load	Following No Load	Following Full Load	Following No Load
1	1.90	2.00	1.60	1.80
2	1.70	2.00	1.45	1.60
4	1.50	1.70	1.35	1.40
8	1.35	1.45	1.25	1.25
24	1.25	1.25	1.15	1.15

first power for transformers with vertical coils.

The AIEE interim report recommends that for emergency overloads with moderate sacrifice of life the peak loads as given in the accompanying table be not exceeded

These overloads are based on 100% name-plate rating at 100% load factor in 30° C. ambient for self-cooled and forced-air-cooled transformers and 25° C. ambient for water-cooled transformers. Increases for less than 30° C. average daily ambient are allowable as for normal overload shown on Fig. 1.

There are many things which must be investigated in addition to the oil and copper temperature before being certain of the maximum load which may be safely carried. Among these are (1) bushings and leads, (2) soldered connections, (3) tap changers, (4) expansion of oil, (5) pressure in sealed transformers and (6) cables, current transformers and other apparatus in the circuit.

Methods for Increasing Capacities

Often it is necessary to increase the capacity of self-cooled transformers over and above the allowable load as given by the interim report. There are three methods in common use:

1. Water Spray: A spray of water directed on a transformer by nozzles which wet the radiating surfaces thoroughly reduces the oil temperature quickly and efficiently. Approximately ¼ gal. per min. of water per kilowatt of loss is required. An increase in capacity of 33% to 67% may be obtained. The oil temperature rise above water temperature varies as the 0.8 power of the total losses.

2. Forced-air-cooling by fans: Capacity can often be increased from 25% to 50% by forcing air over the cooling surfaces by means of suitable fans.

3. Forced circulation of oil: The hot oil may be pumped from the top of the transformer and cooled in suitable radiators then returned to the bottom of the transformer and in that way increase the capacity from 25% to 67%.

The increased capacities which may be obtained by the above three methods vary greatly with the design, the age and the condition of the transformer and it is recommended that in each case the transformer manufacturer be consulted and the condition of the transformer as to freedom from sludging be determined by inspection before the higher overloads are attempted.

This whole problem is based upon the war created necessity for saving critical materials quickly. The steps taken must be such as to avoid serious damage that might result in losses offsetting any possible gains. In securing more kva. from existing equipment—particularly transformers—the quickest way is to load them all to capacity. The resultant savings in copper and steel constitute one of the industry's contributions to victory.

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Fig. 1—Recommended peak loads for a self-cooled transformer based upon average temperature and load factor showing percentage of rated capacity. Similar curves can be prepared for water and forced-air-cooled transformers

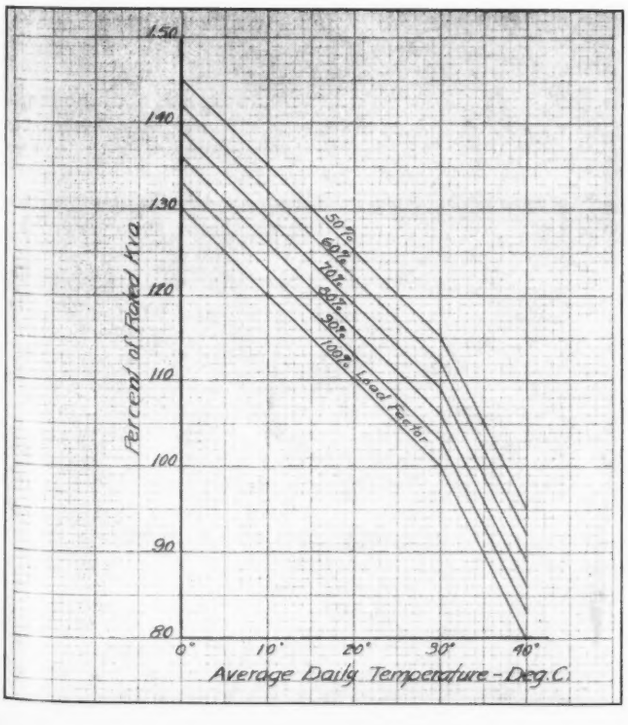
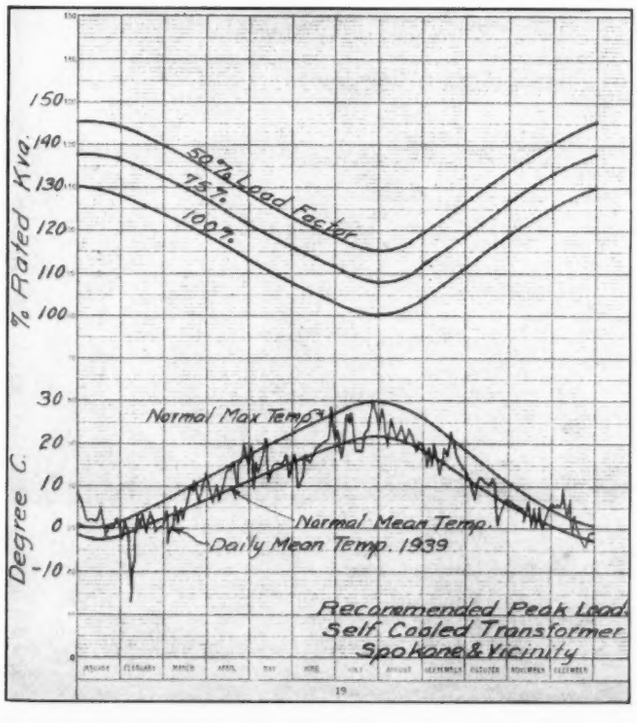
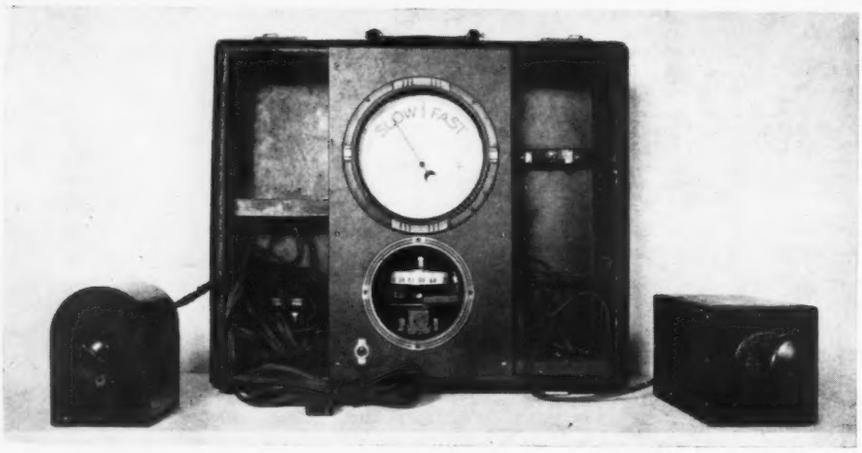


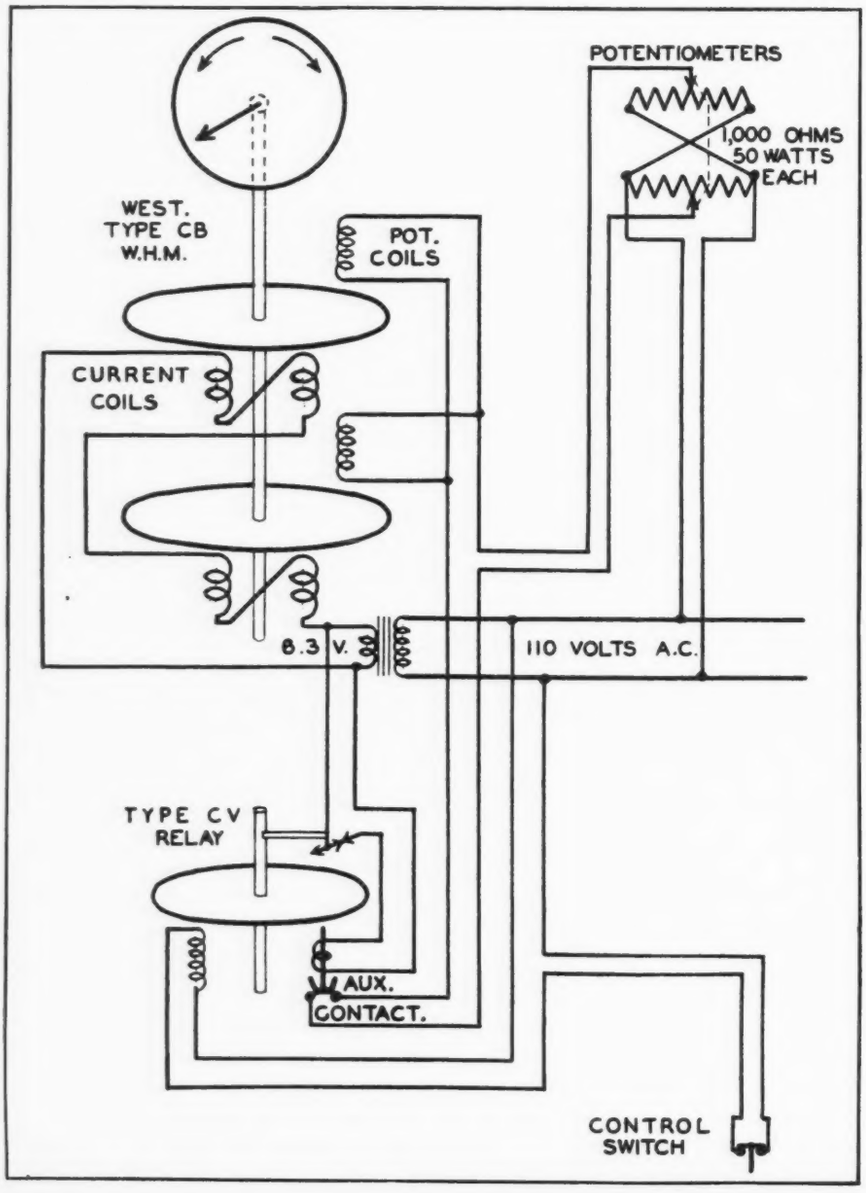
Fig. 2—Daily mean temperature was plotted for Spokane (lower curves) and then recommended loading curves were prepared as shown at top. It was found that the normal maximum temperature should be used rather than the mean





Device Permits Practice Synchronizing

L. E. Ludekins and H. C. Austin
Southern California Edison Co.



Circuit diagram of practice synchronizing device developed for use of substation operators on Edison system

The practice synchronizing equipment is adjustable for different breakers and is enclosed in a portable case

AT MOST generating stations the operators synchronize machines often enough to be able to judge the closing time of the station circuit breakers. At major substations synchronizing is seldom performed, but when it is done large blocks of power are synchronized, and a poorly judged parallel produces a severe disturbance.

In order to enable the operators at the key substations to practice synchronizing, a device has been developed by the Southern California Edison Co. which reproduces the conditions that are encountered in actual synchronizing and that may be adjusted to the closing time of any circuit breaker.

The dial of a Westinghouse CB railroad-type watthour meter was replaced with a dial marked as a synchroscope. A disc-to-dial ratio of 8 to 1 is used to provide proper speed for the pointer. Two potentiometers working from a common control shaft make it possible to vary the speed and direction of rotation of the pointer as desired.

A type CV undervoltage relay, with one dampening magnet removed, is calibrated in cycles, and is used to provide an adjustable time delay between the operation of the control switch and the stopping of the synchronoscope pointer. A standard switchboard control handle is used.

In practicing with the device, the time setting of the CV relay is made the same as the closing time of the switches used for synchronizing at the station. The operator has the control switch and the synchroscope dial before him, while the instructor operates the potentiometers to vary the speed and direction of rotation of the synchroscope pointer. At what he judges to be the proper instant, the operator turns the control switch handle to the "closed" position and holds it there. This opens the back contacts on the control switch, de-energizing the CV relay coil. After the set time interval, the CV relay back contacts close, energizing the auxiliary contactor, which in turn opens the circuit to the potential coils of the meter, stopping the pointer. The angle at which the pointer stops indicates the point at which an actual parallel would have been made. As soon as the control handle is released from the "closed" position, the synchroscope needle resumes rotation.

The device is enclosed in a readily portable case.

Distribution Fundamentals

Dear George:

SHERLOCK HOLMES was one of the great fundamentalists and firmly believed that a sixth sense was no good without the other five. He carried an expensive ornate jeweled snuff box around with him all the time, but it was just the plain Copenhagen inside that he was interested in. When old Sherlock sniffed freshly baked brown bread in the air, he didn't deduce by higher mathematics that baked beans would be on the dinner menu. Just plain fundamentals, my dear Watson.

A lot of engineers, superintendents, managers and other brass hats carry a lot of integral and square root signs in their heads but certain fundamentals throw them for a loss like the stock market did in '29. But sooner or later they stub their toes by skipping the A, B, Cs, and are like the guy who never knew what happiness was until he got married—then it was too late. Fundamentals are harder to ignore than an anonymous note, and they should be given the same attention as a rich aunt on her seventieth birthday.

Digging a hole probably wouldn't head this month's Hit Parade but even in competition it shouldn't wind up in last place, either. Paying attention to small things is as fundamental as the Law of Gravy.

To the digger belong the toils, and it's high time that the "grunt" be given a little attention in his excavation engineering. Most grunts are noted for their prowess with a knife and fork, but in any list of ten firsts they come in eleventh with a bar and spoon. Maybe this should be charged up to foremen. A real foreman isn't an easy foreman or a hard foreman, but a just foreman who can sense a boy's points and make digging a hole as exciting as a lateral pass. Although the ordinary foreman considers the Third Commandment temporarily suspended if he has to instruct a grunt, the boy'll appreciate it even though his mind is pure. No foreman should be so stingy that he build a high tension line around his thoughts, especially if he can dole out as follows:

1. Use the right tools and make sure they're safe ones. Funny how many men go hunting rabbits with a French 75 instead of a 22. That old digging bar gets pretty heavy when it's lifted several hundred times, and it ought to be at least as sharp as the guy using it. The best digger I ever had never lifted the bar out of a hole till it was finished.

2. Know the size of the pole to be set. No use trying to show up the Foundation Company of America, if you're only going to set a toothpick. The Vigilantes brand was 3777, which suggested a hole 3 ft. wide, 7 ft. long and 77 in. deep, which filled the bill for the use they put them to. However, we're just burying a pole butt, and so the hole should be just large enough so that a tamping bar will go around it from the groundline to the bottom of the hole, when the pole is plumbed.

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"A Holey Career"

3. Since the steel in the digging tools doesn't have a temper like the Irish Free State, it's well not to dig too fast, and thus dig too deep a hole. It shouldn't be too shallow, either. The pole butt treatment is such that maximum penetration is made to occur at a point below groundline where maximum rot sets in, and the pole, therefore, should be set with this in mind.

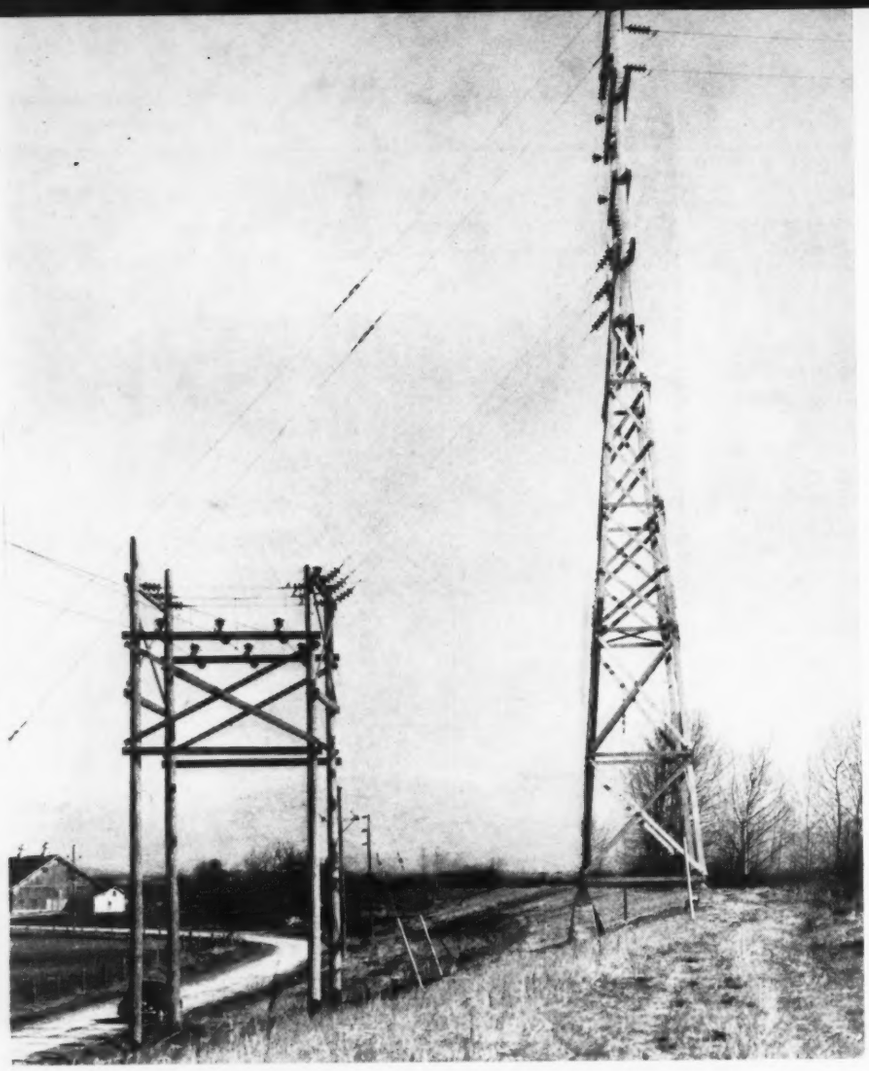
4. It's a Must that the hole be covered carefully if left unfilled for any length of time, unless, of course, you happen to be sore at someone in the neighborhood, in which case, a bear trap set in the bottom will help the company in its good will program.

5. Once in a while something unusual happens while digging, such as running into a buried milk can full of Federal Reserve lettuce or striking oil at the four-foot level, in which case it's well to call the shop at once so they can keep track of your Victory Tax, or advise you whether the land has been proved up on or not.

These few thoughts seem as simple as a Jap general, but it's surprising how many guys are dame dreaming on the job when they should be giving Cupid the hotfoot, all because someone has failed to school them in fundamentals. Poles, wires, holes, tools, insulators, racks, guys and transformers will never make up a real distribution system, if the human touch and personality are missing on the job. If the secondaries are lying on the ground, it's a sure indication of Low Voltage.

Yours,

The Old Soup.

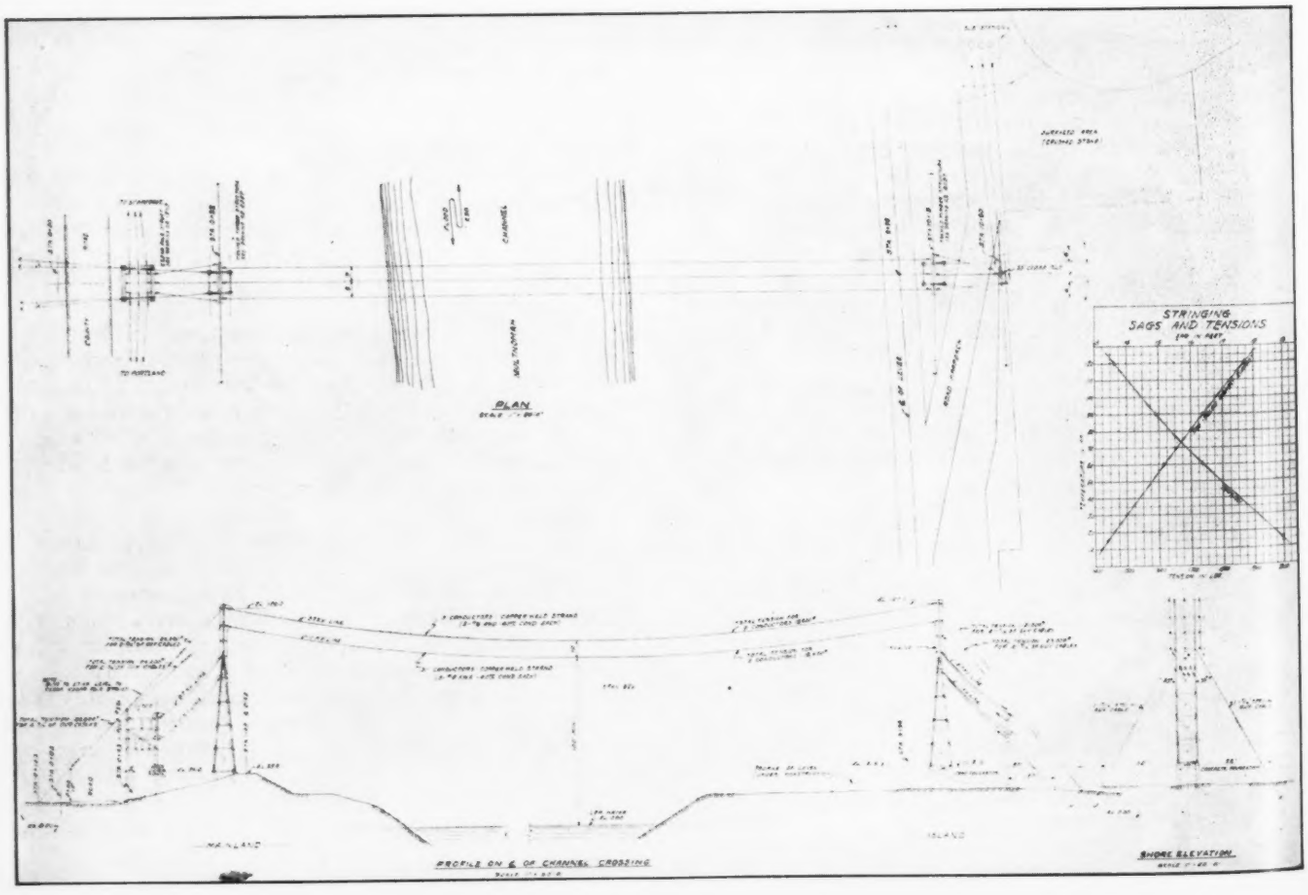


Wood for Steel

BUILT of prefabricated, preservatively treated timber, the transmission tower pictured is one of two framed timber structures recently erected by the Portland General Electric Co. for a 57-kv. overhead river crossing. The towers carry three No. 6 copperweld conductors—with a span of 926 ft.—across a channel of the Columbia River.

Towers are 96 ft. high above the concrete footings and are 12 ft. by 12 ft. center to center of columns at the base. After fabrication, the Douglas fir timbers were pressure treated to a retention of 0.3 lb. of Wolman Salts preservative per cubic foot of wood. Corner posts and upper extensions are designed as columns. All horizontal loads are guyed. The crossing will finally carry two circuits (57 kv. and 11 kv.) with each set of conductors to be guyed independently.

The towers were designed by Timber Structures, Inc., Portland, under the supervision of Walter Brenton, chief engineer of Portland General Electric. "Wolmanizing" treatment was conducted in retorts of the American Lumber and Treating Co. plant at Wauna, Ore.



Merchandising Methods Net Bond Pledges

Campaign technique sells War Bonds to 97.7% of employees on Los Angeles Department of Water & Power system at average of $20.50 per month. Only 51% were purchasers at drive's start

IN attempting to get 30,000,000 working Americans to invest 10% of their earnings, representing about $6,000,000,000 annually, in U.S.A. Preferred, Uncle Sam has launched one of the most ambitious merchandising campaigns in history.

Basically, his problem is to induce people who have a dozen other demands upon their money to part with it for his product—War Bonds. In that respect his problem is not unlike that of electric utilities in the "good old days" when every dealer had row upon row of ranges, refrigerators, washing machines, water heaters and other appliances (remember?). There was competition for the consumer's dollar then, too, and the winner generally was the sales organization that did the best job of merchandising.

Selling War Bonds requires many of the elements that have been used successfully for years by the electric industry.

This may seem heresy to those patriotic but naive individuals who think that War Bonds should sell themselves. As a matter of fact, they should—but they don't. And since they don't, every business organization wanting to make the Treasury 10% Honor Roll must map out a sales campaign for its personnel to execute.

The formula that many firms have followed utilizes the familiar tools of advertising and publicity to inform and to arouse interest in the prospect, climaxed by a personal follow-up to get the signature on the contract. That was the framework on which the Los Angeles Department of Water and Power built its campaign which resulted in earning the Treasury 10% Certificate and "T" on Dec. 7, coinciding with the first commemoration of Pearl Harbor Day.

Because it was declared by War Savings staff officials to be the largest public utility or city employee group in the West to have won the coveted "T" up to that time, the department's experience with War Bond sales is presented as a case history of how the project was handled in one large organization.

When the Treasury Minute Man flag with the 10% "T" symbol was presented to employees of the Department of Water and Power, their monthly investment in War Bonds was $123,918; 97.7% of the 6,184 men and women in the organization were signed up under the pay roll allotment plan and the average investment per employee was $20.50 a month, compared to the Treasury's announced national goal of $18 per worker per month average. Back of this record lay a "stop and go" experience.

Chronologically the account starts in February 1942, when the first employee Bond rally was held, committees appointed and a campaign inaugurated. It was believed at that time that the war interest itself, plus the Treasury's publicity and advertising, would be the principal factors in securing pay roll deduction authorizations from at least 90% of the personnel, which would earn them the Minute Man Flag.

By May, however, only 51% were buying bonds. This was better than the 45% average reported by the 50,000 business firms then members of the pay roll allotment plan but it still was a long way from the desired 90% figure. Also, at this time the Treasury announced its 10% of pay roll program.

When a gain of only 2% had been recorded by August, the committee handling War Bond sales in the department held a meeting to develop a plan that would assure winning the Minute Man flag. Because of previous commitments to employees relative to the amount of individual subscriptions, it was decided to concentrate first on coming as close to a 100% sign up as possible before tackling the other angle. It was thought, too, that by practically doubling the number of subscribers the pay roll percentage might largely take care of itself.

With the full cooperation of management, a plan was devised that controlled sales contacts with 6,200 employees through a committee of five, with other committees handling special phases of the program. This was to be done by utilizing the existing department organization of 27 functional divisions. Each of the committeemen was assigned five or six divisions to contact, working through the executive head or his special representative. This simplified the committeemen's work and guaranteed effective control over all aspects of the campaign.

Ceremonies were held at field centers when Minute Man flag was raised

The 100% drive was explained fully to each division executive, who was asked to designate as many units as practicable within his organization for a series of meetings scheduled throughout the department on Sept.. 2—"Water and Power War Bond Day."

Supervisors of the designated units were then sent instructions and an announcement of the impending 100% drive. All of this information was filtered through the division executive, as were all other information, bulletins, posters and other details during the entire compaign.

The unit supervisor's principal job was to call his group together to outline the committee's plan and then invite nominations from among the group for a War Bond chairman who would have the responsibility of actively working with his shop or office associates in securing their bond subscriptions.

This procedure is considered one of the key points in the successful campaign that followed.

As a result of the meetings there were elected 252 group chairmen, who carried on the brunt of personal solicitations. At the conclusion of each group election, the chairman received from his supervisor a previously prepared letter of congratulation, putting the outcome of the bond campaign directly up to him and his fellow chairmen. Also, he was given material with which he could go to work immediately in securing sign up cards. The data included pay roll cards, Treasury literature, lapel emblems identifying department bond buyers and a "work sheet" showing every employee in his group, with their pay roll numbers and codes indicating which ones were already buying bonds. Obviously, considerable advance planning was necessary to permit distributing this material one minute after the chairman had been elected.

In the bulletin of instructions each chairman was urged to "follow up after a few days on those who do not turn in cards . . . Answer questions . . . Help those who need it in filling out cards . . . Contact all new employees to join the Hundred Per Centers."

Meanwhile, coinciding with the campaign opening, bulletin boards and prominent wall areas were covered with posters supplied by the Treasury. Charts showing the relative standings of each division and of the department as a whole were displayed in central locations as a spur to inter-divisional competition. Other special features to stimulate War Bond consciousness were large envelopes, imprinted with a form for recording bonds bought,

Successful techniques of a sales campaign were employed to sell War Bonds. Here Paramount stars Marjorie Reynolds and Lynda Grey draw winners

in which employees could keep their bonds; cards carrying the heading "Welcome to our 10% Club" presented to each qualifying bond buyer; "10% stickers for home windows or car windshields; framed copies of Treasury certificates to be displayed in offices of sections where all employees had signed up for 10% before the entire department went over the top; official 10% lapel emblems, issued by the Treasury.

Further supporting the all-out campaign, the September issue of *Intake*, Water and Power employee magazine, was dedicated to "the most important subject before the workers of America today."

When this intensified activity opened on Sept. 2, only 53% of the personnel were bond buyers. On Sept. 8 the number had grown to 69% and one month later the 90% mark was crossed.

While the 90% goal was being reached it had become apparent that, in accordance with the Treasury's expressed desire, more emphasis should be placed on the "how much" angle. Accordingly, it was decided to swing into a second-phase campaign that would up the average rate of subscription from the prevailing 5½% to at least 10%.

For the Minute Man flag presentation, in recognition of the Water and Power employees' better than 90% sign up, a public ceremony was arranged to be held at Victory House, the central bond sales point in downtown Los Angeles. This was to be the springboard for a new merchandising drive complete with Hollywood movie stars, $3,000 in bond prizes, tabloid newspapers, rallies and every other appeal that would help in the task of virtually doubling the monthly value of bond purchasing by 6,200 employees who were stationed over an area extending 300 miles north of Los Angeles into the high Sierra region above Owens Valley and 270 miles east to Boulder Dam, in Nevada.

Incidentally, this decentralization of employees, which is typical of most utilities in the West, complicates the mechanics of a bond campaign in contrast to the type of industry where employees are centered in one or two plant locations.

The Victory House event was held at noon, permitting downtown employees to attend.

For the 10% drive the original organization of five committeemen contacting all division heads was retained, the division heads continuing to filter the committee's material down through their respective organizations to the elected group chairmen, who in turn functioned effectively at the point of sale.

In order to maintain a high pitch of interest through frequent reporting of campaign progress and facts, a special publication called *The Bondsman* was issued. Volume 1, No. 1 appeared on the day of the Minute Man flag presentation, congratulating the employees for their achievement and carrying a "teaser" announcement of the $3,000 War Bond prizes to be awarded to employees who qualified by signing up for the required bond quota.

Funds for the bond prizes were derived from joint contributions by executives of the department and the employees association.

Mass sign-ups followed group rallies where wounded service men talked

To enable group chairmen to concentrate their selling efforts on those subscribing less than the quota, the accounting division tabulating machines ran off lists for each group, showing individual subscriptions then in effect and the amount that would qualify each employee.

Rules for the bond prizes provided that everyone who was signed up on a quota basis in the first week qualified for all three weekly drawings plus the final grand prizes of $1,000, $500 and $300 in bonds. Weekly prizes were two $100 bonds; two $50 bonds; and four $25 bonds. An employee who didn't sign up the first week could still qualify the next week for the remaining two weekly drawings plus the grand prizes. This put a premium on early action.

From the standpoint of employee relations, one feature of the prize awards is worthy of mention. It was realized that those in the lower wage brackets could not so readily meet the 10% goal as others. This condition is recognized also in Treasury schedules showing "suggested" investment percentages for various income levels.

Taking this schedule as a guide, the following bond "yardstick" to determine eligibility for prize drawings was adopted: Employees earning $100 per month or less, $6.25 or more in bond pay roll deductions; $101 to $125, $7.50 or more; $126 to $150, $9.50 or more; $151 to $174, $12.50 or more; $175 and over, at least 10%.

So far as the drawings were concerned, anyone buying in accordance with this "yardstick" was eligible on an equal basis. Furthermore, from the standpoint of good relations, it was agreed that every employee buying bonds on any basis, from $1.25 a month up, would qualify for the $500 and the $300 final prizes (but not for the $1,000 bond). This was in recognition of the indisputable fact that no matter how patriotic their desires, some persons—not only those in the lowest salary brackets—simply could not stretch their budgets to meet the suggested quota.

Thousands of new pay roll deduction authorization cards upping former amounts, as well as completely new cards, were received the first week. Stubs for all qualifying buyers went into a barrel on display in the employees' cafeteria, where the drawings were held at the lunch hour. For the first drawing, Paramount Studios lent the services of Marjorie Reynolds and Lynda Grey. Other screen personalities made the following drawings.

Names of winners appeared in *The Bondsman* the morning after the drawings, committee members working at night with a commercial printer in order to have the news reported and distributed promptly.

In the first week, pay roll percentage climbed from a little over 5% to 7.46%.

Appearing every other day, the tabloid played up news of outstanding bonds records, such as a group with an average of $146 a month that oversubscribed its quota to 199%; another where every man was buying at least 10%.

Every publicity opportunity was capitalized upon to sell bonds. On Navy Day, for example, arrangements were made to have a number of wounded sailors convalescing in a southern California hospital appear as honor guests at the luncheon and make brief talks before employee groups where subscriptions were lagging.

The fact that some 700 Department of Water and Power employees then were in the armed forces and deserved every financial support from those at home also was emphasized. Any of the department's service men who visited the offices or shops on leave were asked to say a few words for bonds at employee sales meetings.

When the three week campaign ended with the drawing of the grand prizes by 20th-Century Fox actress Sheila Ryan, the monthly investment in War Bonds by Water and Power personnel amounted to $109,534—an impressive figure but still short about 1% of the 10% goal. An incidental but important point was that the number of bond buyers had jumped from just over 90% to 96%.

A final concerted effort in those units that were still below quota raised the required amount in time for the department to be included in the list of business organizations cited in the Treasury's "First 10% Roll of Honor" published in all Los Angeles newspapers on Pearl Harbor Day.

This review of one utility's War Bond selling experience may create the impression that a tremendous amount of effort was expended. That is a fact, but these points deserve recognition:

(1) Any effort necessary to help win the war is well expended.

(2) Utility employee groups require special consideration because, even though the average salary for the industry may compare favorably with others by normal standards, the individual's income has not skyrocketed in the way that is typical of most industry workers.

(3) Utility workers probably operate on a budget that includes larger percentages for fixed obligations, such as payments on a home, life insurance, etc., hence cannot so readily make adjustments as their aircraft and shipyard cousins.

(4) While *management* pressure may do the job more quickly, voluntary and enthusiastic *sales* pressure from within the employee ranks is a more desirable, though necessarily slower, way of reaching the Treasury's quota of "Everybody 10% every payday."

● THREE BOOKLETS, *How to Make Your Refrigerator Last Longer, How to Make Your Washing Machine Last Longer, and How to Make Your Ironing Equipment Last Longer,* have been issued by the Office of Price Administration for home distribution.

Visual Repair Training Program by G-E

Meetings throughout West shown films depicting ways to service ranges and smaller appliances

WAR changes things. During the past year it has changed the repair service situation materially by drawing off much of its skilled personnel. To help its service dealers to adjust to this situation, General Electric Co.'s appliance and merchandise department has adjusted its program to one of assisting and training of new personnel.

Its factory service program, described in ELECTRICAL WEST, June 1942, pp. 72-73, is being supplemented by a coast-to-coast service training program by which the manufacturer and distributor assist the servicing dealers in their job of keeping appliances working for the duration. This series of meetings began Jan. 11 at Los Angeles and will continue through March under the general direction of H. M. Wade, of the San Francisco regional office, and W. J. Kern, field engineer. It has had the local assistance of product service managers of the General Electric Supply Corp. offices in the various divisions.

Meetings were held Jan. 11 in Los Angeles at G. E. Supply; Jan. 13, San Diego; Jan. 15, San Bernardino; Jan. 18, Santa Barbara; Jan. 21, Phoenix, under the supervision of W. K. Whyte, product manager, G. E. Co., Los Angeles.

The next series jumped to the Northwest where on Jan. 26 meetings were held at G. E. Supply Corp., Portland, under B. D. Winship, operations manager, G. E. Co.; on Jan. 28 at Yakima at the G. E. Supply Corp., where E. J. Parsons, G. E. Supply Corp., Portland, product service manager, presided; in Seattle Feb 2, and Tacoma Feb. 3, Paul E. Baker, G. E. Supply Corp., had charge, and in Spokane Feb. 5, C. W. Hixon.

More meetings are scheduled for California early in March. At Bakersfield Mar. 3 Paul Hodshire and Fresno Mar. 5 R. W. Downing, both of Valley Electrical Supply Co. will have charge. Later meetings will be held at San Luis Obispo and San Francisco. Then the training program will jump to Missoula, Mont., Mar. 15 and Butte Mar. 17, where R. H. Howard, G. E. Supply Corp., Butte, will preside.

These training meetings are devoted principally to the servicing of electric ranges and water heaters. However, a digest of repair information on small appliances, refrigerator and laundry equipment and a round-table discussion between servicing dealers and the distributors and headquarters field men constitute the meeting. Highlight of the range training is a full color movie entitled *Don't Blame It on the Oven*. Because range complaints usually can be traced to lack of knowledge of correct use of the oven or of mixing of ingredients, the picture shows exactly how these should be done and suggests a diplomatic way for the service man to call these facts to the attention of the complaining housewife.

A sound slide film entitled *Heating Unit Service* and another *Heating Device Repairs* give for the first time in visual form a technique of making repairs to such appliances that can be made outside of a factory service shop. It also indicates what type of fault should be sent to the factory for repair.

Repair parts information, 1943 service plans, and specialized information for the particular service problems of the area in which the meeting was held were the discussion subjects at the round table. A large number of trainees for repair service these days, observed Mr. Kern, are women, and they are doing an excellent job when properly instructed.

Salvage Old Iron

People are funny that way. They don't mind turning in an old appliance to the scrap pile, but they'll be darned if they will let some dealer repair it and resell it to make a profit on it. As a result many usable appliances have been wasted when very badly needed by war workers who cannot obtain new.

An attempt to recondition the psychology responsible for this attitude has been made by the Southern California Edison Co. in a test program at one of its divisions. The merchandise division, under H. C. Rice, planned a program and the advertising department, under Howard Hayes, in an advertising campaign in local papers urged the public to turn in old electric irons to local dealers, get cash for them, and help others less fortunate than themselves get a much needed appliance. The advertisement frankly stated that the iron would be repaired and put in condition by the dealer to resell to less fortunate neighbors. A patriotic appeal, it was hoped, would overcome the psychology and prevent many useful appliances from going into the scrap pile until their usefulness could be more completely employed.

Meanwhile, a canvass of used irons has been made among the various charitable agencies, such as Salvation Army, Goodwill Industries and Volunteers of America and the scrap piles of junk dealers. Many appliances thrown out contain parts that are difficult to obtain and these can be salvaged. Ingenuity and better craftsmanship in repairing heating elements by brazing and welding can be made to return many a still useful appliance to much needed service.

Train Reefer Men

Finding that refrigeration repair service requires a specialized type of training, the Bureau of Radio & Electrical Appliances of San Diego County in cooperation with a local vocational school has started a course in refrigeration repair service. Classes began Feb. 9, are held twice a week, Tuesdays and Fridays, from 7 to 9:30 p.m., and a step was thus taken to replace the heavy loss of service personnel from dealers to war agencies and military services in the area.

It is estimated that as many as 5,000 domestic refrigerators may be tied up in the summer in the area due to lack of repair and the approach of warm weather. An appeal was made to all dealers to help get enrollment in the classes.

Registration of 30 men, all employed but one, included refrigeration service men from beverage companies, ice companies, grocery chain stores as well as dealer service men evidently wanting to perfect their knowledge and technique. Twelve classes of theory and twelve of shop practice are being taught by Elton S. Bailey of Refrigeration Equipment Co. A waiting list for a second school is being started.

Scouts Out

Philco is scouting the market for merchandise that its dealers can sell in lieu of the radios and refrigerators they once sold. A new catalogue has been issued to dealers by which they can place orders with their distributors without waiting for a salesman's less frequent calls under today's war conditions. Approximately 25 new products have been made available to distributors, many of whom have secured additional ones on their own initiative. These are available in addition to the company's industrial storage batteries and "Philcophone" for intercommunicating systems.

Parts Directory

Dealers aided in finding parts by California utility

PARTS and personnel—these are the two pivot points of the battle to keep appliances working for the duration. To supplement its training program to supply personnel, Pacific Gas and Electric Co. has now issued an *Electrical Appliance Parts Directory* for service repair dealers after making a thorough canvass of the territory for "pockets" of supply parts.

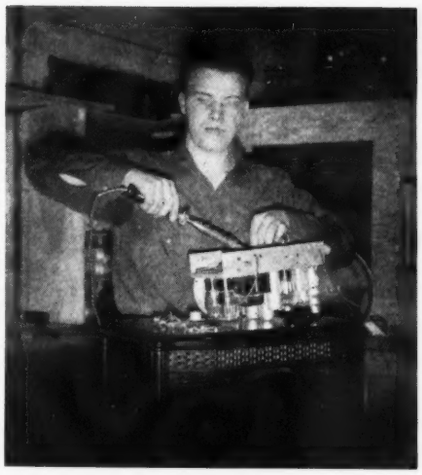
This directory is printed on stiff cardboard, designed for rough usage about a service shop and is thumb indexed ingeniously. On yellow paper are listed the appliances by makes with a code number for each, indicating from whom repair parts for that appliance are available. The green portion of the directory contains code numbers serially with the name of the supplier of parts, address, phone number and whom to ask for.

The classified directory gives only local sources of parts for domestic appliances, excepting ranges and water heaters.

Meanwhile, the other divisions of its over-all "durationized" program are developing increasingly smooth operation. Graduates from the repair program at Samuel Gompers Trade School are made available to dealers upon call to Richard Hurff. Likewise, the company's residential field representatives are calling upon customers to instruct them in the care and use of home appliances. They give information as to repair service dealers in position to make repairs and they present the specially prepared manual *The Lady of the House and Her Mechanical Servants.*

"Blind" Repairs Taught

To teach signal corps trainees how to repair their radio equipment under the only condition he has ever known —the dark, LaVon Peterson, young radio craftsman of Preston, Idaho, blind since birth, was appointed an instructor in the army training division of the Electronic Radio Television Institute at Omaha, Neb. Written up first in the *Electro Dealer* of Utah Power & Light, and a radio trades magazine, LaVon Peterson was offered the position. He works in a dark room teaching the men to develop a sensitive touch and to do vital work under conditions they may face any night in the field. Only 22 years of age, he has been interested in radio since 12 and has operated his own repair business at Preston for the past several years.



Blind since birth LaVon Peterson of Preston, Idaho, now teaches repairs

Shortage of repair parts and materials would shortly have made it difficult for him to continue. In this way he is able, although handicapped, to contribute invaluable service to the country in time of war.

Maintaining Flourescent

With so many new and comparatively inexperienced hands to carry on the service and maintenance job in a factory or office building, quick, easy ways of instructing are at a premium. Extensive use of fluorescent lighting makes thus welcome two pamphlets recently issued by two of the lamp manufacturers, Westinghouse and Sylvania.

The Westinghouse booklet is titled *Fluorescent Service and Maintenance Handbook* and is available from its lighting division at Cleveland. It touches briefly and concisely with just enough information upon such essentials as power supply, lamp replacements, lamp and starter testing, luminaire testing, cleaning of both industrial and commercial luminaires, radio interference, noise, low temperature operation and contains suggestions for making test equipment and complete wiring diagrams.

The Sylvania booklet is smaller and approaches the subject differently. It starts out with cleaning procedure, mortality of lamps, factors affecting performance and life, darkening, testing and trouble shooting hints. Both should be on the maintenance man's desk.

● ASKING OPINIONS of its former dealers, the Youngstown Pressed Steel Co., which made kitchen equipment, such as sinks, cabinets, shelving and similar unit equipment for built-in kitchens, has sent forth a letter asking for suggestions for future designs.

Electricless Market

THAT furniture manufacturers and dealers have proved their staying power and, with certain limitations, will be able to get materials for civilian goods was the encouraging assurance brought to 850 persons attending the Western Furniture Conference "Industry Dinner" at San Francisco Feb. 2.

Speakers were Colonel Lawrence H. Whiting, president of the American Furniture Mart, and now Chief of the Classification Branch, Military Personnel Division, Services of Supply; Roscoe R. Rau, of Chicago, executive vice-president of the National Retail Furniture Assn.; and Charles W. Collier, managing director, Pacific Advertising Assn., San Francisco.

With reference to the outlook for manufacturers, Whiting said that furniture is now considered as an essential industry and that, while wartime conditions will curtail and restrict many types of home furnishings, manufacturers have proven their resourcefulness in use of alternate materials and their ability to adapt production to present conditions.

The industry has not fallen down on the job, he declared, and is making more than 900 different items for war use. Despite this production he reported only 27% of the industry's plant capacity has been converted to war production. The balance is available for further government needs and for manufacture of civilian merchandise, he pointed out.

Since it is probable that when peace comes, many of the large plants now in war production will start producing for the home, Whiting warned manufacturers against backwardness in learning new techniques and methods. He visualized a "packaged house" of the future, complete with everything needed for housekeeping, which would materially improve the standard of living.

Highlighting the outlook for retailers, Rau declared that the situation today is not so critical as was predicted a year ago, and that retailers are now receiving more cooperation from Washington.

The staying power of the retail home furnishing business is dependent primarily on close trade cooperation. with dealers working together to control inflation by keeping prices down and serving consumer needs as adequately as possible, he stated. There is sufficient merchandise to meet basic civilian needs, he said.

Pointing out that there is no solution to the manpower problem, he suggested that dealers make the best of it; streamline services.

Work for Leagues to do Despite War

Idaho association turns to aid appliance repairs; B. C. League carried on activities in fourth war year

Too late for inclusion in last month's review of plans and programs of the commercial departments of Western utilities and electrical leagues were several interesting reports from which other similar groups may be able to glean ideas. As space permits they are summarized here.

Idaho Electrical Equipment Assn.

EVERY assistance possible will be given to electrical dealers, repairmen, and wiremen so that they also can be a major factor in maintaining and conserving all electric equipment in this area. Whenever possible, repair work will be referred to these agencies.

Training aids for dealer repairmen will be continued by Idaho Power Co. and assistance in obtaining repair parts will be given dealers. Customers will be assisted to get electrical equipment repaired by dealers with the objective of saving all possible gasoline, oil and tires for the customer, dealer and utility.

In this territory a large number of wiremen and electrical dealers have closed up shop and gone into defense work or other activities. For this reason the Electrical Equipment Sales Assn. as such will be practically dormant for the duration. In our widely scattered territory it is practically impossible to gather groups together for meetings or to obtain attendance. Therefore we shall not endeavor to promote the Electrical Equipment Sales Assn. sales program for the coming year.—*R. E. Gale, secretary.*

Electrical League of B. C.

OPERATIONS of the Electrical Service League of British Columbia in 1942 were beset by many difficulties and yet progress was made. Effects of the war were more seriously felt in the industry during the past year, naturally reflected in activities of the league. One of the main objectives has been to promote adequate wiring. No curtailment of this activity has been made.

There has been a reduction in the number of contractors operating, several having closed their business to engage in war industries The league has maintained close contact with the contracting end of the business, especially through the Vancouver Electrical Assn.

It was necessary to discontinue the activities of the Home Appliance Council. With Government restrictions and reduced amount of merchandise the council could not continue as an effective agent for the dealers, and it was also decided that at the present time the council could do little to assist the dealers in maintaining their business and developing a cooperative plan for maintenance and repair of appliances. While work has been abandoned the council still meets.

The league assumed responsibility last August of carrying on the work which had previously been done by the utility to keep dealers well posted on various regulations of the Dominion Government, its various wartime boards and in the interpreting of these regulations.

To date little progress has been made to form a cooperative plan for the interchange of repair parts among dealers, but it is possible that preliminary work done in this regard may produce results this year. The league is continuing to solicit sales reports from dealers, so that information can be kept up to date in readiness for postwar merchandising.

While the government has imposed restrictions on the manufacture of fixtures for commercial use, the league still continues to receive inquiries for information on improved lighting and, as there is at the present time a good stock of fixtures available at Vancouver for office and commercial use, there have been a number of splendid installations, both fluorescent and incandescent. In order to stimulate conservation of existing materials the B. C. Electric and the league cooperated in an educational campaign emphasizing the necessity of keeping present equipment in good repair.

The league also has been active in the industrial lighting field. Here a large number of fluorescent installations have been made. Many of these installations were of high intensity. During the past year the league submitted lighting plans and specifications for 32 offices, 9 stores, 41 industrial plants, 40 residences, 7 farms, and 25 miscellaneous layouts.

The desire of the government to restrict the promotion of merchandise affected the residential lighting program of the league. The Electrical Service League of British Columbia was the first in Canada to offer a home lighting advisory service to the public, and this work has grown from year to year. In 1942 the work was curtailed by restrictions on merchandise and by loss of experienced members of the league staff. Miss Rae Jackson, head of this division of the league, however, is keeping the work active.

In all, the home lighting department of the league made 1,945 calls and 779 demonstrations. Representatives only encountered 265 refusals to accept demonstrations. On demonstrations merchandise valued at $22,680 was recommended, and checks reveal that of this total actual sales were made to a value of $13,642. In a breakdown of the 250 working days in 1942, the average calls by this division of the league were 3.23 per day, the average recommended load per demonstration was 422 watts, and the average recommended merchandise per demonstration amounted to $29.12. On call backs the average increased installed load was 262 watts and the average merchandise sold amounted to a known value of $16.22.

A reduction took place in the number of new homes built last year, but the drop was not as great as was anticipated. In all 2,074 new dwellings with a value of slightly more than $4,500,000 were started in the metropolitan area. The new building restrictions requiring a special permit for erection of residences over $5,000 also curtailed the work of the league last year. In 1940, 604 Red Seal certificates were issued by the league, and this rose to 991 in 1941 and dropped to 362 last year. There are now a total of 5,329 Red Seal wired homes in Vancouver, as well as 98 duplex blocks, and 145 apartment blocks containing 2,091 suites wired to Red Seal requirements.

During the month of December league records show 42 homes were wired and 1,512 outlets installed, of which 40 were added as the result of league suggestions. Nine new residences were wired for electric ranges, six homes were wired to Red Seal requirements save for range installations, and nine residences met complete Red Seal specifications.

The program of the league for 1943 calls for the development of industrial cooperation by contacts with all branches of the industry, the promotion of adequate wiring and lighting development, as staff permits, of the lighting and wiring plan layout services of the league, continuation of residential lighting services, and the maintaining of existing architectural contacts. Red Seal promotional and field work also will be maintained.—*R. Hall, secretary-manager.*

Textiles—in War as in Peace

World's oldest industry performs modern miracles

WITH ever quickening tempo the friendly hum of the spinning wheel has echoed down the centuries—symbol of a mighty industry.

Its hum is heard today above the din of war.

Capt. Rickenbacker heard it as the lives of his party depended upon a thickness of rubberized fabric.

The hard-pressed soldier on a far-off Pacific isle hears it when he sees fresh supplies and ammunition descending from the sky via friendly parachute.

Adolf Schickelgruber hears it when winter joins forces with the enemies of his ill-clad armies and hastens the day of his defeat.

Yes, man is dependent upon textiles from the cradle to the grave – in peace and in war.

In peace man demands comfort and beauty. In war he must have comfort and protection. The textile industry is coming up to these expectations.

It is developing hundreds of special fabrics for special purposes. It has created clothing for wear, miles high in the stratosphere, and fathoms deep under the sea, clothing to meet the daytime heat of the desert and the bitter cold of its nights, clothing for the tropics and the Arctic, the swamps and mountains – for every climate and every condition.

Modern scientific warfare has forced the development of textiles that were not even thought of a year or two ago: camouflage nets; strong, light, wind-resistant Nylon tentings for the Arctic; heavy Nylon rope for glider towing; parachutes and parachute shrouds; self-sealing gas tanks; panzer hangars; cartridge and powder bag cloths; helmet linings; gas masks; fuses; canvas tops; windshield fabrics and seat upholstery for jeeps, trucks and other motorized equipment; uniforms for all armed services and for nurses, WAACS, WAVES, SPARS and MCWRS. Then there are windbreakers, raincoats, ski-troop uniforms and other items two numerous to mention. The Star Spangled Banner itself is a textile.

The Quartermaster Corps alone has issued specifications for over 300 different fabrics! Add to this the requirements of the Navy, the Air Forces, the various Civilian Defenses, the Red Cross and Lend-Lease and the sum total of textiles required for military and allied uses is approximately 70% of the total produced before the war to meet civilian requirements!

How the textile industry has been able to meet this unprecedented war demand, superimposed upon the industrial and essential civilian needs, is an inspiring story.

First, it stepped up its production to an all-time high. *Textile World's* index of textile-mill activity records three successive records for 1940, 1941 and 1942, the period covering the defense program and the first year of the war. This index for 1942 stood at twice that of an assumed "normal" year. It is noteworthy that this was accomplished mainly with existing equipment.

Second, the textile industry did a job of plant-conversion which was a masterpiece of intra-industry cooperation and idea-sharing.

Third, its technicians developed new and superior fabrics and finishes. Its engineers and production men increased the speed and the efficiency of the entire production machine.

How well all this was done becomes evident when we consider the obstacles to be overcome. Imports of critical fibres have been cut off. There is a shortage of certain chemicals and dyes. There is a high rate of turn-over in manpower and a shortage in experienced labor. It is increasingly difficult to secure machines and repair-parts – just to mention a few of the major problems.

But the textile industry delivered. It has built up an adequate reserve for our rapidly expanding armed services. It is helping to supply the armies of our allies. It is providing for our civilian population . . . all without giving the war leaders a single moment of serious worry.

Major General Edmund B. Gregory, Quartermaster

This is the ninth of a series of editorials appearing monthly in all McGraw-Hill publications, reaching more than one and one-half million readers, and in daily newspapers in New York, Chicago and Washington, D. C. They are dedicated to the purpose of telling the part that each industry is playing in the war effort and of informing the public on the magnificent war-production accomplishments of America's industries.

General of the United States, in special statements prepared for *Textile World*, and in addresses before textile groups, has stated that the cooperation of the textile industry has been outstanding and that the industry has kept ahead of schedule on all the major types of fabrics required.

General Gregory recently pointed out that of the approximately 234,000,000 yards of combed twill produced in this country in 1942, the Army took about 87%, the Navy 10%, leaving 3% for non-military purposes.

Col. Robert T. Stevens, of the Quartermaster Corps, in a recent address, referred to the output of duck. Production of that vital military fabric was twice doubled in six months, between January and July 1942, he said, and an annual capacity of 600,000,000 yards of all types of duck was made available. "The current rate of production of cotton duck is five times normal," said Col. Stevens, "and 38% comes from converted carpet, plush and upholstery mills. Based upon known requirements, production in this field is fully adequate".

"Fully adequate" is high praise when it refers to duck production. At the outbreak of the war it looked as if there was no possible chance of meeting requirements, at least during the first year. Nor would there have been if other types of mills had not shifted to making this fabric, and if experienced duck manufacturers had not gone "all-out" in teaching the newcomers, potential post-war competitors, everything they knew about the manufacture of duck. American industry offers many such examples of unselfish cooperation.

Another outstanding accomplishment, made necessary by the interruption of burlap imports, was the conversion of looms producing peacetime fabrics to the production of bag fabrics. The tremendous demand for sandbags, camouflage cloth, food, agricultural and other bagging, caused a conversion order to be issued for the purpose of raising the annual production rate of osnaburg from 263,500,000 yards to 660,000,000 yards, and bag sheeting from a rate of 488,000,000 yards to 855,000,000 yards. The result of this order, and of the military schedules already in effect, was to put the cotton weaving industry about 88% into war, essential industrial, and essential civilian production.

Plant conversion went on with feverish speed. Carpet looms were swung to blankets and duck; the lace industry turned to mosquito netting and insect netting of which it produced millions of yards. The flat-knitting industry with its tricot machines also is engaged in the manufacture of mosquito netting. The sewing thread industry was converted to the production of combed yarns. What once was the silk industry is now doing a tremendous amount of war work. Those mills which had equipped themselves for throwing Nylon yarns for hosiery are now throwing the Nylon for parachutes. That section of the silk industry that was equipped for weaving rayon fabrics is producing fabrics of high-tenacity rayon for flare chutes, cargo chutes and delivery chutes. Many silk and rayon looms that formerly wove clothing materials are now weaving parachute fabrics.

Today practically all Nylon is used for military purposes and the bulk of high-tenacity rayon goes into military fabrics.

Above and beyond all the new developments is the gigantic job of producing millions of yards of standard fabrics of many colors and weaves. To produce all the uniform fabrics and blankets is in itself quite a job. The woolen and worsted industry has been doing it magnificently. Tent fabrics and summer fabrics produced by the cotton industry are no less a formidable assignment. I could point to myriad other jobs no less impressive.

The production man can indeed take pride in this record and behind the production man, the textile technician has been working tirelessly. Mildewproofing and waterproofing, so vital in a world at war, are in a new stage of effectiveness. A new process for waterproofing fabrics employs vinyl acetal plastic in place of precious rubber. Textiles that glow in the dark have been perfected for black-outs and other applications. American genius is solving problems many of which seemed insurmountable. Silk, for example, was something the Japanese thought we could never duplicate. A new synthetic textile filament that weighs but one eighth of the finest silk filament threatens to put the Japanese silkworm out of business after the war so far as we are concerned. The post-war possibilities of this development challenge the imagination.

Nor has the primary textile industry been alone in its contribution to the war. The textile machinery industry has been converted almost entirely to war work, save for a few facilities required to relieve extreme bottlenecks and supply essential maintenance and repair-parts.

Similarly, some textile mills, particularly hosiery mills hard hit by the silk and Nylon cut-off, are utilizing their space and skilled staffs to produce parts for war equipment.

The immediate significance of all this is its importance in the winning of the war. There is, however, a post-war implication which is important to the future of America. A mass production textile industry will serve civilians after the war more effectively than ever before, and will put new standards within the reach of millions. A long step has been taken toward that completely synthetic textile industry which some observers see in the future. The tempo of such changes has been accelerated tremendously. The oldest industry in the world, now one of America's largest, is showing a youth and vigor that promise much for the future... nationally and internationally.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

Home Dehydrators for Victory Gardeners

Utilities issue specifications for building low-cost drying units; experiments precede developments by PG and E and Puget Sound men

ONE answer to current speculation on the percentage of victory garden produce which will wither on the vine or rot on the back porch is dehydration. Instructions for building home driers have been made available recently through Pacific Gas and Electric and Puget Sound Power & Light companies.

The PG and E unit was designed by Thor W. Christenson, of the company's farm division, with the idea of providing a low-cost home dehydrator which would be easy to build, yet flexible enough to take care of differences of climate and varying requirements on the system. Pictured below, it consists of a cabinet (which, if necessary, can be made out of odds and ends), eight drying racks and any one of several electric heating devices.

Christenson went to work on the assumption that there is some form of small electric heater in almost every home on the PG and E system and that the householder who does not own one can borrow from a neighbor in return for use of the cabinet. If no heater is available, however, his design provides for substitution of 12 100-watt lamps.

Although the model is plywood, the cabinet can be built of practically any material on hand — scrap lumber, fiberboard, insulating board, or even an old wood refrigerator box. There are no metal parts; even the door latches are wood.

An electric fan, housed in a separate box at the top of the cabinet, is not essential but will speed up the drying operation under certain conditions and for the first three hours of the drying period. The fan can be used alone during the initial stage in warmer climates and for products which have a particularly high moisture content.

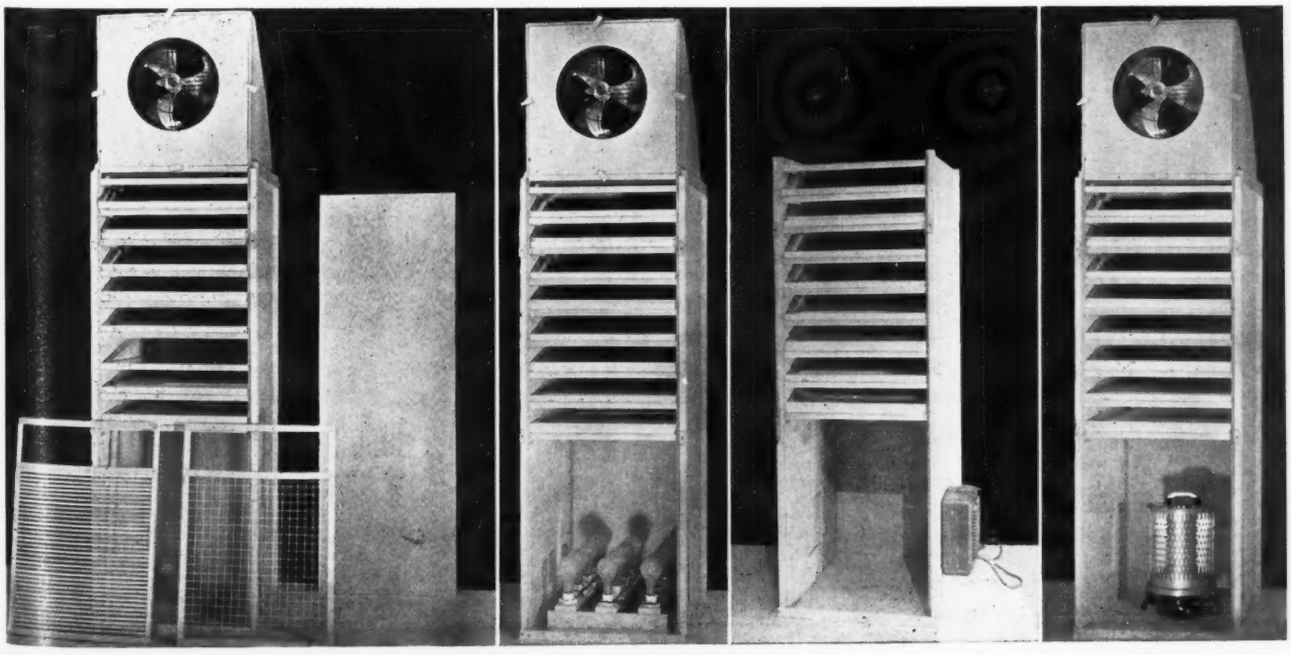
Drying racks or trays may be made with wood slats or by notching the frame and lacing it with fish line. An open space approximately five inches in width is left at one end of each tray and the eight are arranged in the cabinet with openings alternated from front to back to allow even circulation of air from the bottom up through the top.

With any heating arrangement except the fan-type air heater, bottom ventilation should be provided by cutting a 2 x 25-in. opening at each side of the cabinet near the bottom, it is pointed out.

Vegetables are shredded and fruit sliced before being placed on the trays, which are covered with cloth to protect the produce. Each tray will hold about 1½ lb. of wet produce. During the drying operation, trays should be alternated from top to bottom. With a normal drying temperature of from 100 to 160° F., average drying time for vegetables is from 5 to 10 hours and for fruits from 8 to 24 hours. It is suggested, however, that tests be made under varying conditions.

Dimensions of the box were laid out with an eye to convenience in ordering lumber by lineal feet from the mill. The cabinet is made out of one sheet of plywood and is 20 x 28 in. x 60 in. high. Outside strips are 1 x 2s. Tray slides are ¾ x ¾ in. wood and ¼ x ¾ in. material is used for the wooden slats. Finished trays measure approximately 27½ x 18 in.

And just to prove that the unit is versatile, Christenson points out that it can double as a clothes dryer—that is by using a fan-type air heater or by backing it against a register, where there is a warm air furnace.



These pictures of Christenson's model show how the dehydrator can be adapted to individual needs. Heating arrangements here are 12 100-watt lamps; a Thermador fan-type air heater; and a Wesix heater. An electric fan is not essential but will speed the first stage of the drying operation

Puget Sound Driers

FOLLOWING extensive tests, Charles W. Wildebour, in charge of Puget Sound Power & Light Co.'s Farm Electrification Laboratory, drew up the specifications for the four-tray and single-tray driers shown in the accompanying diagram. Wildebour was assisted by Edith Rauch, company home service director, and Glen Cushing, and credits much of his information to the University of Idaho and the state colleges of Oregon and Washington.

Wildebour gives these instructions for operating the four-tray drier, which was patterned after a design by the University of Idaho's agricultural engineering department:

"When drier is first started, open the top ventilator about one inch. After three hours, reduce this opening to about one-half inch or less. Trays should be staggered from front about as follows: bottom tray, 12 in.; second tray, 9 in.; third tray, 6 in.; fourth tray, 3 in. Generally the lower trays will dry more rapidly; tray locations, therefore, should be rearranged as required to secure even drying. It is advisable also to stir the fruit occasionally."

For the single tray unit, the following directions are given:

"When drier is first placed in operation, place a board over the top ventilator holes so as to cover about two-thirds of each hole. After three or four hours, move this board so that only about one-half of each hole is covered.

"It may be advisable to stir the fruit occasionally to promote even drying. During warm days the drier may be placed in the sunshine with cover removed. The sun will heat the top while the lamps are heating below."

Drying Procedure

It is suggested in the bulletin accompanying the drier specifications that fruits and vegetables be prepared as for table use and that best results may be expected from clean, ripe, carefully prepared produce.

"When testing fruit or vegetables for their condition of dryness, the per cent of moisture removed as determined by the loss of weight is a more accurate check than the feel or appearance of the product," the bulletin continues. This is because a dried product has a tendency to appear leathery or sticky when it is at a high temperature but becomes hard and brittle when cool.

The accompanying table gives recommended drying schedule and reduction percentage of weight required for satisfactory storage.

When apples, apricots, peaches or pears are peeled or cut, they darken rapidly and change in food value, flavor and odor. Sulfuring, precooking in steam or boiling water or dipping in salt solution are suggested methods of preventing these changes. Following is information given by Wildebour.

Sulfuring

"Sulfuring properly done protects vitamins and preserves the natural fruit color and flavor. Use only fresh, ripe, sound, clean fruits—those at the right stage for table use. Prepare for the drier. Spread on wooden slat trays. Stack the loaded trays on blocks of wood about 4 in. high with the bottom tray resting firmly on the blocks. Laths should be placed between the trays to provide good air circulation.

"Place sulfur in a clean, flat metal container at the rate of one teaspoonful for each pound of prepared fruit and set pan with sulfur in front of trays. Cover the trays and sulfur pan with a tight box about a foot longer than the trays. If the box is absolutely air tight, leave an opening about 2 x 6 in. near the sulfur. Ignite the sulfur and fit the box snugly against the ground. Sulfuring should be done out of doors."

Lye Solution

"If prunes are to be dried whole, they should be dipped in a boiling lye solution to remove the waxy coating and to check the skin. The lye solution is made by dissolving one level tablespoonful of commercial concentrated lye in one gallon of water (one pound in ten gallons). An enameled container should be used. Avoid using aluminum.

"Immature fruit should be dipped 35 to 45 seconds and ripe fruit about half that time. The fruit should be dipped long enough to form many small cracks in the skin. After dipping, wash the fruit thoroughly to remove the lye. Spread the prunes in single layers on the trays and dry.

"It is best to start the prunes at 130° F. and do not let the temperature exceed 140° F. until the skins are wrinkled. After this the temperature may gradually be increased to not more than 175° F."

Drying Schedule

Product	Preparation	Drying Time In Hours	Per Cent of Original Weight
Apples	Sliced, *salt water 10 min., drained	15 to 20	15 to 20
Apricots	Halves, salt water 10 min., drained	20 to 25	15 to 20
Beans	Green, boiled 15 min., drained	10 to 15	14 to 18
Berries	Whole	10 to 15	15 to 20
Celery	Whole	10 to 15	8 to 10
Corn	Boiled 15 min., cut, drained	10 to 15	25 to 30
Cherries	Pitted, salt water 10 min., drained	25 to 30	15 to 20
Peaches	Halves, salt water 10 min., drained	15 to 20	15 to 20
Pears	Halves, salt water 10 min., drained	15 to 20	15 to 20
Prunes	Whole, salt water 10 min., drained	25 to 30	25 to 30

*The salt water solution is made by adding 3 to 5 teaspoons of salt to 1 gal. of water.

Farm Bulletins

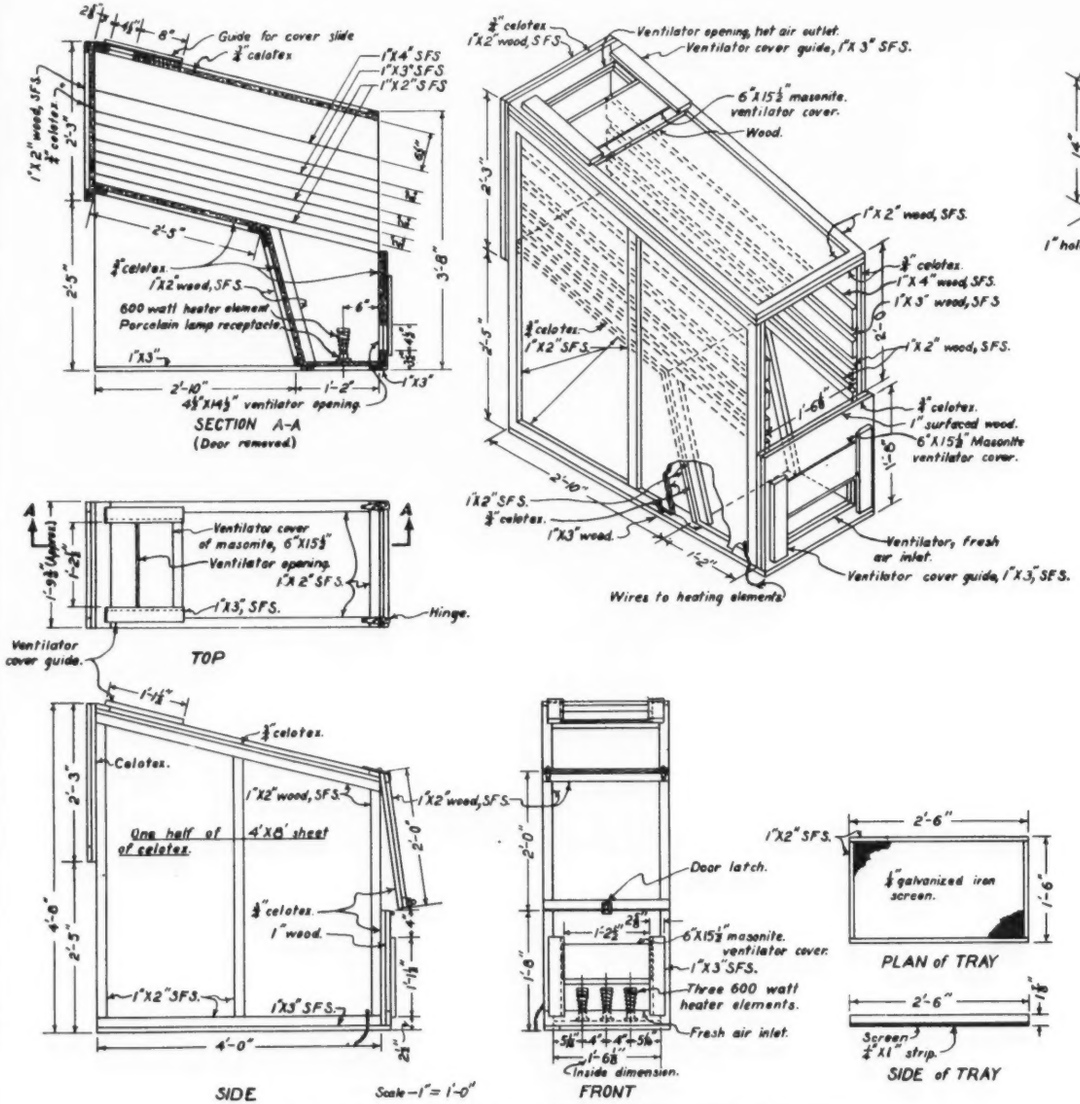
University tests basis for recommendations

University of California College of Agriculture has published bulletins on *Irrigation by Sprinkling* and *Sanitary Care, Operation and Installation of Milking Machines.*

Bulletin No. 670 on irrigation is by J. E. Christiansen formerly of the University agricultural experiment station. It is intended primarily for farmers operating sprinkler systems or contemplating such operation. It includes, however, some technical material essential to an economical sprinkler system design, which is of interest to engineers, irrigation contractors and others engaged in the manufacture, sale or installation of sprinkler equipment.

Circular No. 69 on care of milking machines, by J. L. Henderson and C. L. Roadhouse of the experiment station, and A. H. Folger, formerly supervisor of official advanced registry tests, is a revision of a bulletin originally published in 1932. Recommendations are based largely on investigations conducted for a period of two years on methods of cleaning, sterilizing, operating and installing milking machines. Contention of the authors is that, with proper methods, milk drawn with the aid of machines may be produced as low in bacterial content as that produced with the most scrupulous care in hand milking. Explicit directions are given for such care.

Opposite are specifications for building the four-tray and single-tray driers recommended by Puget Sound



SINGLE TRAY FRUIT DRYER

Scale- 1½"=1'-0"

NOTES

Standard dimension lumber has been specified whenever possible. Such lumber is always smaller than stated due to surfacing. In the stating of distances between parts, the net size of the lumber has been considered.

The inside of the larger dryer is painted with alumuminum paint.

FOUR TRAY FRUIT DRYER

PUGET SOUND POWER & LIGHT COMPANY

FARM ELECTRIFICATION DEPT. 6-18-42 SEATTLE

M.G.S.

War Advances Cold Cathode Linear Lighting

Industrial applications follow satisfactory experience with interior lighting of offices and business quarters

Simple troughing of sheet metal is used for reflector and protection of double or multiple tubes used in shops and machinery areas. At Berger Engineering Works, Seattle (upper picture, below) troughing was used along the top of the window as well. At Pacific Huts, Inc. (bottom) tubing was mounted under a flat board, offering it protection and support as well as acting as a reflecting "ceiling"

SEATTLE, according to George K. Comstock, president of Electrical Products Consolidated of that city, has more cold cathode fluorescent lighting than any other city in the U. S. And in Bellingham approximately one foot of tubing per capita has been installed because of three large installations recently made there.

Difference between cold and hot cathode fluorescent lighting is one of operating voltage and length of tubing. The hot cathode fluorescent lamp is the familiar tubular lamp, self contained, demountable, made in short lengths, generally two, three or four feet in length. It operates at a comparatively low voltage, employing a ballast and a starter, the cathode filament having to be heated first before the arc is struck. Hot cathode tubing usually is fabricated on order, tailor-made to the job, in lengths of 10 ft. or more. Because a high voltage transformer is used the arc is struck instantly. Likewise the tubing is more permanently installed but the surprisingly long life of the tubing turns this factor into an advantage in reduced lamp renewal.

In both types of fluorescent lighting the arc is a mercury vapor arc in vacuum, generating a high percentage of ultraviolet wave lengths which activate fluorescent powders used to coat the inside surface of the tubing. Both quantitative and qualitative data are now being made available on the cold cathode lighting, something which this type of illumination has lacked in its development period, and the Fluorescent Lighting Assn. is making an earnest effort to standardize the performance and quality of its members' products in this new field.

More familiar is the use of cold cathode lighting tubing in outdoor signs and decorative lighting. In Seattle, Electrical Products Consolidated has probably furthered its use in interior illumination more than in any other region. Some of the applications are illustrated here and two other installations, one in the offices of Standard Oil Co. of California in Seattle and Webster-Brinkley Co. machine shop have appeared previously in ELECTRICAL WEST. (July 1941, p. 44.)

Burning life records kept by this company of its installations over an average effective burning life of 15 months indicate that only 16 tubes, some 100 ft. of tubing, out of 65,000 lin. ft., have been replaced. No dif-

in Northwest

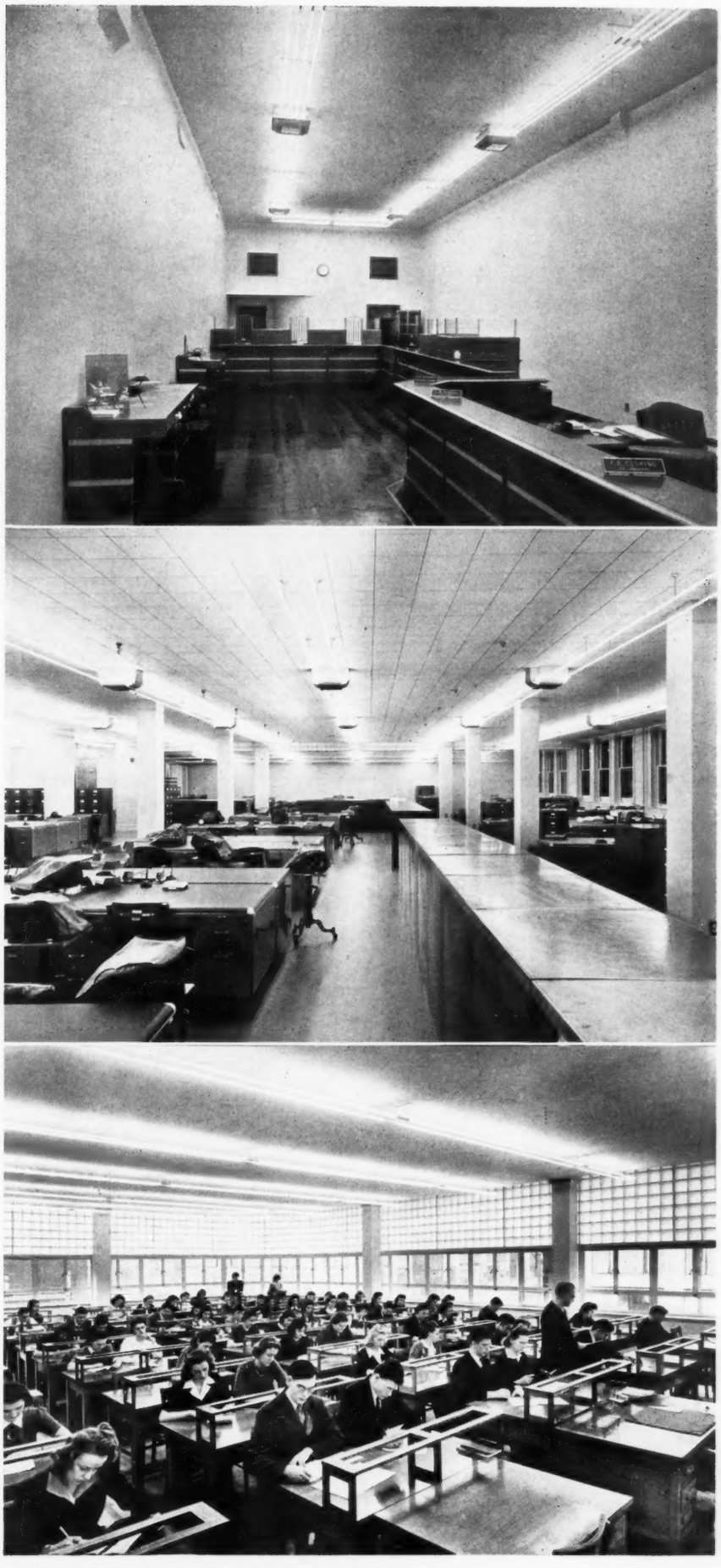
ferentiation was made in the records between tubes replaced because of faulty operation and those replaced because of accidental breakage, yet half of those replaced were because of the breakage.

"Our records of tube replacements are so fantastically low," said Comstock, "that I fear I would be called a liar if I quoted them. However I can quote from a recent letter from Andrew Steers, executive vice-president of Metropolitan Building Co. in which he said, 'We have approximately 20,000 lin. ft. installed in various places in our buildings and we have never had a complaint from anyone who has ever worked under it. Our experience dates back about five years when the first installation was made in our architectural drafting room. As to maintenance, we have never had to replace a burned-out tube.'

"The Webster-Brinkley Co. has said this, 'Our records show that this has been burning some 17,000 hours with practically no replacements.' Recent installations made in Bellingham which justify the 'foot-per-capita' claim, were for Bellingham Marine Railway & Shipbuilding Co., Bellingham Iron Works and Brooks Lumber Co. where some 30,000 ft. of tubing were used."

Under war restrictions installations now can be made only for industrial applications in war production plants or in governmental or war agency offices but commercial installations, in offices and stores, will be made again when the war is over, even as they were in the pioneering period in which this type of lighting was first diverted from electric signs to interior lighting.

In Denver, too, Electrical Products Consolidated has made a number of cold cathode installations for interior lighting. Electrical Products Corp. of California has made some installations, particularly in southern California, but has been more conservative in its promotion.



Office interiors lighted with simple exposed tubing. At top, both decorative effect and lighting combined in symmetrical placing of four tubes at Citizens Federal Savings & Loan Co., Seattle. Center, offices at General Insurance Co. with tubing mounted close to acoustical ceiling. Bottom, utmost simplicity of mounting installed at Metropolitan Business College, Seattle

LIGHT for a FACTORY

Incandescent

WHO

Bailiff Distributing Co., 215 S.E. Madison St., Portland, bottling room. Contractor, Swigert Electric Co. Engineered by R. C. English, Northwestern Electric Co.

THE NEED

Uniform illumination in all parts of the working area to increase production, prevent waste and spoilage, decrease accidents.

CONDITIONS

Prior lighting gave only 5 to 6 foot-candles of illumination, was spotty. Open ceiling rafters, industrial type building with exposed piping and beams.

INSTALLED

Six 300-watt to 500-watt Ivanhoe glassteel diffusers, lamped at 300-watts, spaced 10 x 12 ft. on centers, with two deep-bowl reflectors, with 300-watt silver bowl lamps, as supplementary lighting over the bottling machine.

RESULTS

Average illumination over entire area 27 fc.

LIGHT for a PHARMACY

Incandescent

WHO

Multnomah Hotel Pharmacy, Portland. R. W. Riehs, salesman, Northwestern Electric Co.

THE NEED

Improved lighting for the soda fountain as well as the store.

CONDITIONS

Previous installation three round luminous bowls and candle brackets over the fountain bar.

INSTALLED

Over the bar, four 6½-in control lens units with 100-watt lamps, and four 40-watt amber lumiline lamps. In the main windows four 10-in. 200-watt reflectors in each of the two windows and four 150-watt reflectors in the side window.

Interior lighting—six 300-watt luminous indirect reflectors and one 150-watt closed ceiling indirect fixture. A luminous background sign over the prescription counter was lighted by two 60-watt lumiline lamps.

RESULTS

Average intensity increased to 16 ft.-candles.

EMEA *Dope Sheet* — *Edited by Howard C. Park*
EMEA of So. Calif

Temperature and Electric Insulation

THE maintenance of electrical apparatus is in a large measure the maintenance of insulation. Insulation is probably the most vital part of any electrical device and, therefore, a knowledge of insulation characteristics, materials, and their use is of particular importance, especially to men who must prevent expensive shut downs.

Defined for practical purposes, electrical insulation or the medium separating conductors, is any non-conductor of electricity. This definition is not technically accurate, for tests show that all known "insulations" will, under certain conditions, transmit electricity, although the current may be so small that only the most delicate laboratory instruments will measure it. Insulation resistance and dielectric power-factor-test results, are measurements of this dielectric loss.

Insulations are classified as: solids, liquids, and gases; organic and inorganic; heat-resisting, heat-conducting, heat-absorbing, and acid-resisting; each again is classified as to its dielectric and physical characteristics.

Some of the more important properties of insulation:

1—Dielectric strength
2—Insulation resistance
3—Dielectric loss
4—Specific inductive capacity
5—Acid resistance
6—Mechanical strength
7—Flexibility
8—Hygroscopicity
9—Heat conductivity
10—Deterioration from heat

1—*Dielectric Strength* is the ability of insulation to withstand voltage stresses. This quality is affected appreciably by temperature and chemical change.

2—*Insulation Resistance* is principally valuable as indicating the presence of moisture or other conducting material within or on the surface of insulation. It may not be an indication of dielectric strength.

3—*Dielectric Loss, or Power-Factor*—As a dielectric is the medium separating two conductors, the dielectric loss is the watts loss within the dielectric, or insulation. The presence of moisture, solvents, etc., will affect this loss, which may be sufficiently great to result in ultimate failure of the insulation. The dielectric loss for a given material increases with the moisture content, the temperature, the operating voltage and frequency.

4—*Specific Inductive Capacity*—When voltage is impressed across two or more dielectrics in series, the voltage across each will vary inversely as the specific inductive capacities, or the dielectric constants of the materials. This property has an extremely practical value, particularly when various insulations are arranged or graded for high-voltage applications.

5—*Acid Resistance*, as the term is generally used, implies resistance to the action of specific acids, alkalis, gases, or chemical fumes. Special insulation should be used, not only when the location of the apparatus warrants protection against acids, etc., but also on machines of voltage classes that develop corona. It is particularly advisable if the atmosphere contains moisture, as under such conditions nitric acid may be formed on the insulation where the corona occurs.

6—*Mechanical Strength* is the ability of insulation to withstand compression and tension strains, abrasion, shock vibration, etc.

7—*Flexibility* is the property of insulation that permits it to be bent without being broken.

8—*Hygroscopicity* is the tendency to absorb moisture or collect it by surface condensation.

9. *Heat Conductivity* is the quality of transmitting heat, or of conducting it away from an area of higher to one of lower temperature.

10—*Deterioration from Heat* is a measure of the life of insulation. Engineering research and extensive "life" tests have established the value of this property possessed by a great many insulating materials. Insulations having high resistance to deterioration from heat are always deficient in other properties that are necessary for certain applications. Hence composite insulations are almost invariably used in electrical apparatus.

In general, the standards of the American Institute of Electrical Engineers classify insulations according to the highest temperature they will safely withstand. This is designated as the "limiting hottest-spot temperature."

As a result of experience with machinery in practical service, and of laboratory tests of various insulating materials, limiting temperatures have been established for purposes of standardization. The hottest-spot temperature is the primary point of reference, or the "benchmark", used as the basis for the following scheme of temperature delimitation.

For Class	O	material	
" "	A	"	90° C or 194° F
" "		"	105° C or 221° F
" "	B	"	125° C or 297° F
" "	C	"	No limit yet slctd.

Limiting "observable" temperatures are determined from the limiting hottest-spot temperatures by subtracting therefrom a specified number of degrees, which, for purposes of standardization, is the margin fixed between the limiting hottest-spot and the limiting observable temperatures. This margin or "conventional allowances", for the purpose of standardization is assumed to be lower than the hottest-spot temperature by the following amount:

Thermometer	method	15° C or 59° F
Resistance	"	10° C or 50° F
Embedded detector	"	5° C or 41° F

Limiting observable temperatures are as follows:

Method	Class O Material	Class A Material	Class B Material
Thermometer	75° C	90° C	110° C
Resistance	80° C	95° C	115° C
Embedded Detector	85° C	100° C	120° C

The limiting observable temperature rises of apparatus immersed in oil should be so chosen that the corresponding temperatures of the oil in which it is immersed will not exceed 90° C. or 194° F.

Class A insulation consists of cotton, silk, paper, and similar organic material when impregnated or immersed in oil; also enamel as applied to conductors.

An insulation is considered to be "impregnated" when a suitable substance replaces the air between its fibers, even if this substance does not completely fill the spaces between the insulated conductors. The impregnating substance must have good insulating properties; must entirely cover the fibers and render them adherent to each other and to the conductor; must not flow during the operation of the machine at full working load or at the temperature limit specified and must not unduly deteriorate under prolonged action of heat.

Class B insulation consists of mica, asbestos and similar inorganic materials in built-up form combined with binding substances. If Class A

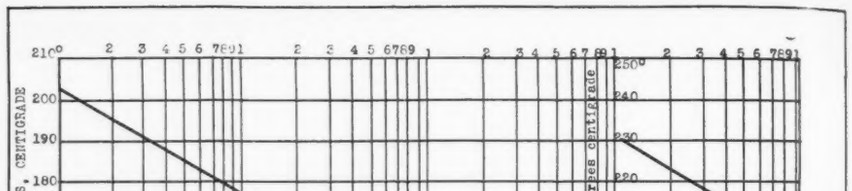
material is used in small quantities for structural purposes only, in conjunction with Class B insulation, the combined materials may be considered as Class B, provided the electrical and mechanical properties of the insulated winding are not impaired by the application of the temperature permitted for Class B material.

Class C insulation consists of inorganic materials such as mica, porcelain, quartz, etc.

Class O insulation consists of cotton, silk, paper and similar organic material when neither impregnated nor immersed in oil.

Of all classes of insulation, Class A is of most importance to the maintenance man, as the largest percentage of electrical apparatus in use today utilizes this class of insulation. Of the properties of insulation, the "deterioration from heat" is the most important.

From laboratory tests and maintenance records of machinery in service, "temperature, life" curves have been compiled, showing the length of service that may be expected from a piece of equipment working at a certain temperature rise. The accompanying graph shows this life curve for Class A insulation, and from this, economics will dictate the advisability of a change in the size of the equipment, change in location, installation of forced ventilation, etc.



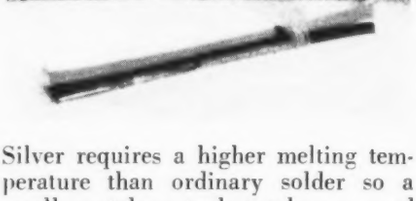
Silver Patch

FEW electricians have ever expected to see the day when they would have to patch wire together to keep equipment in operation rather than replace it with new wire. Such techniques were for extreme emergencies only. The present war has brought forth just such emergencies. Interest in a method to braze ordinary magnet wire in an electric motor therefore is keen these days.

Frank Andrews, Andrews Magneto & Motor Works, Modesto, went back years to an emergency job at a mine when a lightning bolt hit a 75-hp., 2,200-volt motor and wrecked about 50 of the wires. Rotor bars had broken loose from the end ring and cut off a number of wires in the stator winding. The winding otherwise was in good shape.

As there was little chance to get wire for a complete rewind, Andrews repaired the broken wires by silver brazing them together. To do so he made a small U-shaped jig of ⅛-in. wood with a gap of about 2½ in. Each end of the broken wire was first cleaned thoroughly, filed to a flat taper, the ends held together by the jig, using clamps to hold the wire, and then brazed together with silver solder.

After brazing, the joint was painted with lacquer, and cotton winding from scrap wire was wound over the joint.



Silver requires a higher melting temperature than ordinary solder so a small acetylene tank torch was used to make the braze.

"Half the job of brazing is a clean joint to start with," says Andrews. "Use a silver solder flux if you have it, or borax for flux in a pinch.

"This same method can be used to piece together wires in making up a coil. Wire manufacturers use a similar method to splice wire ends, covering the joint with enamel and cotton. It makes a strong joint. Band saws are often spliced in this way. Silver is a better conductor than copper so the joint itself has no resistance if made clean.

"Where lead wires break off from the commutator of d-c motors this same method can be employed. In the case of the motor hit by lightning, some of the inner wires of the coil were damaged so we took the wedge out of the slot, removed the coil, and pieced the new wire in to replace that which was burnt out."

● REMINDER—"We should all keep in mind that all *substitute materials* are limited to *specific use, location* and possibly *time*."—Chicago Division of Electrical Inspection.

New EMEA Officers

Both old and new officers of the Electrical Maintenance Engineers Assn. of Southern California met together late in January to discuss plans for the new fiscal year which began with the February meeting. Walter Smoker, Lockheed Aircraft Corp., president, deferred the appointment of new committees until further discussion could be had as to the year's program. These will include committees to prepare the "Dope Sheets," an editorial committee, educational, membership, program, social and personnel relations. Past custom has been to assign chairmanship of these committees to members of the executive committee.

Officers elected at the Jan. 19 meeting were Walter A. Smoker, Lockheed Aircraft Corp., chairman, replacing Walter Ritter, American Can Co., who had filled the unexpired term of Howard C. Park. Nels Swanson, American Can Co., secretary-treasurer, William H. Carter, General Petroleum Corp., assistant secretary, and executive committeemen Stanley S. Bradley, MGM Studios, C. R. Miller, Western Precipitation Co., Julian Davis, consulting engineer, formerly of Bureau of Power and Light, now teaching classes at USC. Holdover members are Oliver B. Anderson, Santa Monica Technical School, Harry A. Simpson, General Electric Co. and Harry M. Schabbleman, Richfield Oil Co. Retiring members are Hayden G. Lane, General Petroleum, Harold Sedgwick, Safeway Stores, Inc., Glenn Farr, RKO Studios, Inc., Walter R. King, National Biscuit Co.

The Ignitron Rectifier was the subject of the Feb. 17 meeting. It was presented by Adolph Toepfer, of Westinghouse Electric & Mfg. Co.

Electric Eyes Control Tunnel Traffic

Bingham, Utah, one-way tunnel feasible with electric traffic and ventilation control system installation

ONE-LANE facilities in a long vehicular tunnel for two-way traffic must depend almost entirely upon automatic electric signal equipment to prevent difficulties. When the great open pit mine of Utah Copper Co. at Bingham, Utah, had to expand, it not only caused the removal of most of the town to get it out of its way, but made it desirable for Salt Lake County to abandon the county highway which ran across the ore body. It was necessary also to construct a vehicular tunnel approximately 6,000 ft. long through the mountain to allow abandonment of the road across the ore body.

Cost of a two-lane highway tunnel was too great. Therefore, General Electric Co. was asked if it could design equipment to control the traffic automatically through a single-lane tunnel. Requirements were that the automatic control meet the following cycle:

1. Prohibit all vehicles from entering the tunnel until it was clear.
2. Allow traffic to enter only at one end for 3 min.
3. Prohibit all vehicles from entering either end of the tunnel until it was clear of vehicles.
4. Allow traffic to enter only at the other end for 3 min.
5. Prohibit all vehicles from entering either end of the tunnel until it was clear of traffic.
6. Begin with the first and repeat.

If the tunnel is not cleared of traffic within 5 min. after the last vehicle has been allowed to enter, an alarm is sounded and all traffic is prohibited from entering until it is cleared.

Likewise, the carbon monoxide content of the air in the tunnel had to be considered. By means of a detector any carbon monoxide content above a predetermined value actuates relays which stop all traffic from entering the tunnel and start the ventilating fan until the carbon monoxide content falls to a predetermined minimum. This stops the fan and traffic is allowed to flow again.

Watchmen for this tunnel system are electronic relays or "electric eyes" which count the vehicles as they go into the tunnel and again as they exit. When the same number of vehicles have left the tunnel as have gone into it during any one cycle it is known that the tunnel is clear. If the outgoing tunnel is one less than the ingoing count it is evident that a "lost sheep" remains inside.

A patrolman stays within hearing of the alarm bell and when it rings he rides through the tunnel to scare out the laggard. Equipment is then reset to allow it to take up its cycle.

Natural draft is provided during most of the year from the chimney effect of the tunnel. The ventilating fan runs only in case of unusually dense traffic. Elevation at the upper end is approximately 350 ft. higher than the lower, with a 6% grade.

When the automatic traffic control was first placed in service, some trouble was encountered from boys placing a board in front of the relays to give extra counts and thus tie up traffic. A few hours in the Bingham jail soon eliminated this source of disturbance.

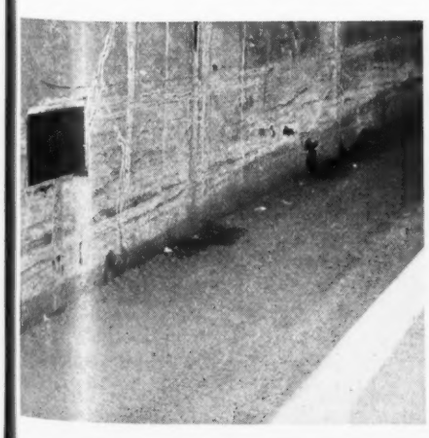
Carlquist at relay control panelboard

Approximately 600 cars go through the tunnel every 24 hours, each one causing two operations of the equipment. After 3 years of service, only minor repair parts have been required.

The original installation was done by the electrical department of Utah Copper Co. and turned over to Salt Lake County, where it is in charge of W. R. Carlquist, superintendent of the county electrical department.

About the only difficulty encountered, other than periodic renewal of tubes and cleaning of contacts, has been when motorists over indulged at holiday time, were unable to determine whether a traffic light was red or green. Some trouble due to snow drifting in and covering the opening in front of the photoelectric relays during heavy snow storms has caused temporary interruptions, according to W. B. Clark, engineer for General Electric Co.

Below: Housing for two photo relays in tunnel wall. Right: Upper end of tunnel, showing roll door, signals, ventilating blower and caretaker's office. Tunnel is approximately 6,000 ft. long



Prepare for CMP

New plan gives promise of materials for maintenance

APRIL is the month by which time the Controlled Materials Plan is to replace the PRP. So March will be a month of transition from one to the other. The change will affect manufacturers, utilities, distributors and contractors, by affecting the construction industry. *Allocations* will take the place of *priorities*. A project or a prime contract will carry with it an allotment of critical materials and an allocation number, by which to obtain them. It is presumed that only those projects or contracts for which there is material available will be authorized at the source.

This, however, does not take care of utilities requirements nor those of maintenance and repair of existing necessary industrial and civilian facilities. The utilities, previously under P-46, now have a division of CMP of their own, headed by J. A. Krug, and operate under the CMP order U-1. After Mar. 31 deliveries of controlled materials for repair, maintenance and operating supplies are to carry only CMP allotment symbol MRO-U, with no priority rating (but really getting an AA-1). A certification in a new form must be signed.

For construction of authorized new lines priorities remain the same except with new CMP symbols. Withdrawals from inventory are further restricted and the voluntary exchange of excess inventories is now mandatory and under the new Inventory Control Section. New purchases of materials are not to be made until efforts to obtain them through this section office have failed. The standard PD-200 form is now to be used to seek priority ratings, except that projects calling for less than $2,500 are to be sought on PD-1 or PD-1 or PD-1a.

Motor shops are coming under CMP also, or should seek to do so if they have not applied, since only by coming under one of the allotment numbers for repair and maintenance can they expect to continue to obtain copper for rewinding. Motor repair shops are classified with manufacturers in the CMP, under the service branch. Most products used by motor repair shops are "B" products, the difference between A and B products being explained simply as follows by NISA: "Coils for maintenance and repair are B products, but coils manufactured for use in new motors are A products. When in doubt, ask your supplier."

To prevent depletion of warehouse stocks in wholesalers hands of essential materials for maintenance and repair, (which are procurable on PD-1x applications with better certainty of fulfillment now that an AA-1 or AA-2x is assigned to them rather than the impotent A-10 of the past) the WPB started a process of inventory control. First product affecting this industry so to be controlled is wire.

Wire

After Feb. 15 a warehouse may fill an authorized CMP order or an AA-5 or higher, if it calls for less than 500 lb. of any one item to any one customer. (CMP Reg. 4) No one can buy more than 2000 lb. of any copper item (one size, one color, one type) from distributors in a calendar month. This regulation is to prevent a customer with a single large order from depleting a warehouse stock to a point where it cannot serve its usual purpose. In case some rush job requires greater quantities of wire in a short time, appeal must be made, evidently, from this rule.

Formal price ceilings on wire, cable and cable accessories were likewise established by OPA early in February. Schedule 82 supplants the freeze of Oct. 29. Prices are those of Oct. 15 with a multiplier of $.00325 per lb. of lead for lead cable, and an increase of 2.375c per lb. for weatherproof.

CMP regulation No. 5, covering maintenance, repairs and operating supplies for delivery after Mar. 31 has been issued. CMP regulation No. 6 to cover construction is to be issued soon. No. 5 does not include materials for maintenance or repair of buildings, electric power, or for plant expansion or construction.

Controllers for electric motors must be simplified and use less critical materials under conservation order L-250. Buses are reduced, stainless steel prohibited, enclosing cases cannot use copper, aluminum, chromium, nickel, etc., ampere ratings are prescribed to load to capacity, specialties such as instruments are to be eliminated.

Fluorescent lighting fixtures are cut still further in the amount of metal they can use under L-78 as amended Jan. 27. Size of lamps determines weight of metal permitted (three 40-watt lamps, 3 lb. of metal, exclusive of ballast and hanging devices.)

Contractors are still under OPA's MPR 251, despite protests and attempts to obtain injunctions in Washington. Meanwhile one of the controversial items, time-and-material work, has been interpreted as coming under MPR-136, according to *Electrical Contracting*, p. 92, Feb. 1943.

Authorization to use the Pacific Coast Electrical Data and Sales Book for pricing electrical contracts under MPR-251 has been received by A. E. Rowe & Co. Inc. providing that for reporting purposes, the margin computed therein on both labor and materials be separated so as to conform to the form outlined in the regulation.

Domestic appliance news of the month is limited. Domestic washing machine industry groups met to discuss ceilings on used washers. Prices for each group of machines would be listed "as is", 90-day and 1-year guarantee, probably with rebuilding specifications similar to those on vacuum cleaners.

Emergency repairs to commercial refrigeration are speeded by a revision of P-126, providing an AA-3 rating for medical, an AA-4 for food storage commercial refrigeration.

Extensions to serve farm electrical equipment were relaxed, too, provided the farmer already owns or can obtain equipment without priority assistance and is certified by his county war board.

All housing now is centered in the National Housing Agency, and new rules call for building only of war housing, not for sale but for rental, using only WPB's critical list materials even though others may be available, and located accessible to the industry it is intended to serve.

United Electric Co. of Oakland was ordered to have all priority assistance suspended for nine months for misusing ratings and selling wire in defense housing projects.

PD-1X

To reduce red tape materially and speed up procedure as well, the WPB distributors branch urges that supply houses use form PD-1X to obtain replacements of their stocks of all items used in supplying dealers and contractors with minimum stocks of materials and parts for repair and maintenance. With this form and the exercise of some good judgment it will not be necessary to ask contractors or dealers to supply A-10 ratings on P-100 nor to carry on the cumbersome paper work of processing all these little orders through their offices. The distribution branch promises prompt handling of PD-1X requests to the particular end-use divisions from which the ratings for filling inventory orders will come in proportion to the total supply and allocation.

Further speed in processing is promised in the establishment of one of the decentralized branches of WPB in San Francisco where PD-1X and other orders will be processed without going to Washington. This should be set up by next month.

Another 10% War Bond Plan Initiated

Los Angeles Chapter, NECA and IBEW start pay roll deduction plan applicable to shifting employment

COOPERATION between the local union of IBEW and the Los Angeles Chapter, National Electrical Contractors Assn., has produced another electrical War Bond Savings bureau for the Los Angeles area similar, but differing in some details, to that established in San Francisco. (ELECTRICAL WEST, Nov. 1942, p. 67). This, too, is a pay roll deduction plan made to fit the transient employment of electrical workers from job to job and among several contractors. Locals of the International Brotherhood of Electrical Workers from Los Angeles, Wilmington, Pomona, Burbank, Pasadena, and Santa Monica are represented. A plan was worked out by them and the NECA chapter in cooperation with officials of the U. S. Treasury War Savings staff.

The system differs from the San Francisco one in that the financing on the part of contractors is a voluntary assessment from each contractor participating rather than a direct contribution by the association for its members. The union, however, makes a monthly contribution of $75. Another difference is that the union card of each member signing a pledge for pay roll deduction is stamped in red ink "Bond Deduction 10 Per Cent." This enables the new employer immediately to continue deductions of pay roll to that union member's account.

Each contractor participating, depending upon his average number of employees, pays an advance. Those employing 10 or less pay $15, 10 to 25, $25; 25 to 50, $50 and 50 employees or more, $100. Every bond issued to each employee costs the contractor 25 cents. This amount cannot be charged to the employee under Treasury rules. When the original amount has been used up the contractor will then be billed 25 cents for each bond issued to his employee. Any unused advance eventually will be returned to the contractor.

Funds received by the bureau will be deposited in two separate bank accounts. The operating fund derived from the advance from contractors and the monthly contribution from the union will be used only to defray expenses of operation. The other fund will be that derived from pay roll deductions sent by the employers to the bureau to the account of employees. From these funds the money will be expended in purchase of War Bonds for the employee and delivered to him.

Contractors participating report to the bureau each week on a pay roll report sheet, keeping a duplicate themselves. This sheet contains the employee's name, social security number, wages and deduction. A check is sent to the bureau for the total deductions applicable to purchase of War Bonds on behalf of the employees of that firm. A duplicate pledge card, signed by the employee and listing his own and his beneficiary's address, gives the bureau the necessary information for purchase of bonds to his account. The duplicate is held by the employer and is his authority for the pay roll deduction. The union is notified and union cards are stamped with a notation that deductions are to be made.

Checks drawn on either account must bear the signatures both of A. L. Stone, president of the NECA chapter, and Gene Gaillac, international representative of IBEW. Both are co-chairmen of the War Bond committee. The bureau is housed at the NECA office, 132 West Third St., Los Angeles, and managed by Warren Penn, secretary of the NECA chapter.

Contractor members on the joint War Bond committee are: A. L. Stone, Stone Electrical Supply Co., Los Angeles, co-chairman; R. E. Arbogast, Newbery Electric Corp.; J. O. Case, Quality Electric Co.; R. F. Doll, Mactolf-Doll Electric Co., Glendale; H. L. Evans, Nicholas Electric Co.; R. M. Fry, Fry Electric Co.; L. I. Goddard, Pacific Electrical & Mechanical Co.; S. F. Hill, Hill Electric Co.; H. R. Vancott, Vancott Co.; all of Los Angeles, and Howard Stolper, Burbank.

Union representatives include Gene Gaillac, international representative, Los Angeles; Edward L. Brown, supervising district business manager, Wilmington; George E. Ellicott, supervising district business manager, Los Angeles; Paul Fernbach, business manager, Pomona; William Glaser, business manager, Wilmington; Jack Grant, business manager, Los Angeles; R. L. Hall, business manager, Burbank; Al Harrison, business manager, Wilmington; K. Lundquist, business manager, Los Angeles; E. E. Mecham, business manager, Pasadena; Joe Nielsen, business manager, Santa Monica.

Samuel Gray, associate administrator, Treasury Department War Savings staff, cooperated in setting up this bureau.

Samuel Gray, of Treasury Dept., (seated), Gene Gaillac, IBEW co-chairman, and contractor co-chairman A. L. Stone

● WALTER W. R. MAY, Portland General Electric Co., newly elected president of the Portland Electric Club, took office for the year 1943 from C. A. Comstock, West Coast Power Co., at a recent meeting.

Other newly elected officers are: first vice-president, J. J. Goodman, Northwestern Electric Co.; second vice-president, Stanley Burkholder, U. S. Rubber Co.; secretary, A. M. McLean, Portland Public School System; treasurer, W. B. Portouw, Fouch Electric Mfg. Co.; and sergeant-at-arms, J. B. Kilmore, Pacific Power & Light Co.

On the executive committee are A. B. Cayo and T. W. Fitch of Portland General Electric Co., and C. A. Comstock, retiring president.

● HIRAM G. DILLIN, San Diego Gas & Electric Co., has been elected president of the San Diego Electric Club for 1943. Other officers are: first vice-president, William W. Powell, Coast Electric; second vice-president, George R. Gray, San Diego Gas & Electric; secretary-treasurer, Lyle Jones, San Diego Gas & Electric; directors, Oscar G. Thompson, General Electric Supply Corp; Harvey K. Watt, Thearle Music Co.; James B. Lyon, Lyon Rural Electric Co.; Marvin E. Musgrave, San Diego Gas & Electric; Bruce B. Gravitt, General Electric.

Harry Anger, serving his second term as president of the Electric Club of Washington, has renamed last year's committee chairmen to serve in 1943. They are: Chris Hawkes, program; James Ferguson, membership; R. D. Horning, adequate wiring; Ray U. Muffley, budget; Stephen I. Sanislo, safety; Joe Osier, publicity; William S. Gaunt, legislative; J. D. Sparks, entertainment; Dr. E. C. Kilbourne, sick.

Rocky Mountain Chapter IAEI will hold its annual meeting at Denver on March 26-27.

Take Up Slack

All the slack left in the "safety factor" is being used up in today's electrical installation. To determine just how much slack can be taken up, and how little safety factor can be hazarded provided the chief topic of discussion at the Jan. 27 meeting of Southern California Chapter, International Association of Electrical Inspectors, at Glendale, Calif. Absence of W. J. Tretheway, chairman, shifted the leadership of the meeting upon O. D. Butterfield, president of the Southwestern Section.

In placing more load upon existing equipment E. W. Morris, engineering department supervisor, Westinghouse Electric & Mfg. Co., Los Angeles, told the inspectors to watch: (1) efficiency losses, (2) design factors of the equipment, (3) insulation, (4) age and condition, (5) favorable voltage and frequency, (6) favorable operating conditions, such as ambient temperatures, torque, atmosphere, etc. In transformers the inherent thermal capacity depends upon the dissipation of heat losses. In both motors and transformers the temperature effect on insulation which must be removed from the conductors determines the result. Inorganic insulation, such as mica, porcelain or glass, can withstand hotter temperatures.

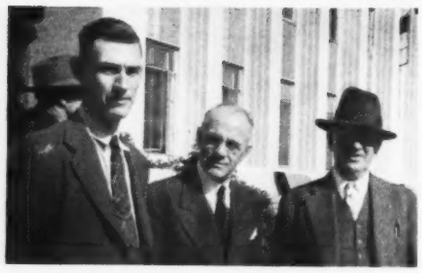
Other economies in use of copper suggested were heavier loading of motor controllers, elimination of meters, test lamps, gadgets and control circuit fuses on panel boards as well as forced cooling of transformers.

How to comply with the state Safety Orders and limitation order L-225 was a question put to Frank Short, of the Industrial Accident Commission. Short, however, said the law under which the Safety Orders are prepared was not flexible enough to make changes and that such installations as were made under L-225 would continue to be in violation of the Safety Orders and should be replaced as soon as the emergency ends.

R. H. Manahan, chief, electrical division, Los Angeles, counseled the use of judgment under present conditions, saying that an evolution is taking place. Once in a while an inspector finds conditions which are not in the rules. He must decide what constitutes a reasonable safe practice. Many of the rules have a "safety factor" which in these times must be used up the same as one is expected to use up the full motor capacity.

Arthur Kempston, PCEA, advocated following the code and interim amendments. He called attention to changes listed in Underwriters' standards. Victor Hartley, managing director, PCEA, cautioned that with the probable influx of new appliances after the war the present time is auspicious for enacting substandard sales control ordinances since all merchandise is now being cleared and hazardous and poorly designed appliances can thus be controlled at the start. PCEA, he said, is redrafting its standard ordinance for that purpose.

Next meeting of the chapter will be held Mar. 31 at Burbank with Larry Trim, electrical inspector, as host. J. C. Crannell, electrical inspector, Glendale, was host at the January meeting.



O. D. Butterfield, section chairman, H. G. Ufer, and J. C. Crannell, host

Cold Cathode

Co-author of a paper on the subject, presented to the Illuminating Engineering Society wartime conference at St. Louis, H. J. Chanon, now illuminating engineer, General Electric Lamp Dept., Los Angeles, reviewed that paper as the major item of the Southern California Section meeting, Feb. 2, in Los Angeles. Chanon and A. C. Barr, of Nela Park, had summarized the data now available on cold cathode fluorescent sources. (See *Illuminating Engineering*, December 1942, p. 769.)

Describing first the differences between hot and cold cathode lamps, Chanon continued a factual comparison of the two, touching upon comparative efficiencies, length of life, tube brightness and considerations in selecting either for a given lighting task. The data as to the ordinary fluorescent lamps, (hot cathode) are now available. Color, light emission, length, brightness, as well as ballasts, are all standardized and design with this source is positive. With cold cathode there are more variables to take into account.

These variables, each having a bearing, include: size of tubing, tube currents and transformer size, for the operating current depends on the number of feet of tube, total footage loading on transformers, characteristics of transformers, pumping of the tubes, phosphors used in coating the tube, electrode design, fabrication of tubing. As diameter of tube decreases brightness increases. This should require shielding.

Balancing these are the long life of cold cathode tubing, but this is shortened by higher loadings which produce more illumination and require more insulation. Less wiring is required but more critical materials are needed in high-voltage transformers than in ballasts. He presented tables showing critical materials requirements of both types of lighting and of the properties affecting the specification of cold cathode lighting.

Urban Beh, chairman of the section, presided. The study club topic, led by Ed Reynolds, was the substitution of now no longer available lamp sizes with other types still obtainable. Next meeting in March was to be with the Office of Civilian Defense.

Its chairman called to active duty in the Navy, the San Francisco Bay Cities Section of the Illuminating Engineering Society called upon one of its always active members, William P. Bear, Pacific Gas and Electric Co., to fill out the unexpired term of John Walsh. Both Walsh and Bear had been loaned to the Office of Civilian Defense regional headquarters by PG and E, but Walsh was called to active duty in the Naval Reserve as lieutenant, junior grade.

Another vacancy on the board of managers, that of Kenneth Knopf, was filled by Gilbert Trosper, of PG and E, San Francisco division. Bear, in accepting the chairmanship, announced appointment of committee heads. Dr. L. A. Brown, Stanford University, heads the educational committee; William A. Cyr, ELECTRICAL WEST, publicity committee; Sam Hazelton, Jr., General Electric Lamp Dept., Oakland, membership, and Gilbert Trosper, PG and E, program. Other standing committees have been eliminated for the duration, and H. Robison, PG and E, Oakland, has been appointed chairman of a new wartime lighting committee. The board of managers now consists of Chairman Bear, Dr. Brown, Walter Carlson, G. E. Lamp Dept.; Nate Graves, PG and E, Redwood City; Robert Dummel, Holophane Co., and Trosper.

What critical electrical materials are now permitted in war housing installations was made the topic of discussion, with authoritative experts to answer questions, at the Feb. 25 meeting of the Northern California Chapter, Southwestern Section, International Association of Electrical Inspectors, at PG and E auditorium, San Francisco. The Electrical Contractors Association of Northern California joined with the inspectors for the meeting.

James A. Whiteside, regional representative, War Production Board; Gilbert Kneiss, district manager of priorities for northern California; George Sharp, housing specialist of northern California, were the government representatives at the meeting.

Portland Chapter, National Electrical Contractors Assn. was formed last month in that Oregon city with the assistance of W. J. Varley, field representative of NECA. Roy Kenney, Kenney Electric Co., was elected chairman, W. C. Grasle, W. R. Grasle Co., secretary-treasurer. Among the charter members are the firms of Tice Electric Co., Jaggar-Sroufe Co., Dimitry Electric Co., A. R. Johnson Co., Kenney Electric and W. R. Grasle Co.

PCEA *Panorama* — *Edited by Mary Shoop*

Safety Standards

Wartime activity has peacetime benefits

A WARTIME activity with postwar benefits is the code and ordinance committee's work on the revision of the ordinance regulating the sale of substandard electrical merchandise. Recently completed, the revised ordinance is now in print and work will start soon on its promotion along with the Uniform Electrical Code.

The two regulations are complementary, in that the Uniform Electrical Code regulates wiring installations against the hazards of fire and personal injury, while the appliance sales ordinance requires that similar safety standards be met in the appliances and devices attached to the wiring system.

As pointed out by B. C. Hill, chief electrical inspector, Oakland, and chairman of PCEA's code and ordinance committee, the present war period offers an ideal opportunity for the widespread enactment of the appliance ordinance as a protection against the influx after the war of poorly constructed appliances.

If a city enacts this legislation now, while few electrical appliances are available for sale, when present restrictions are removed from appliance manufacturing, local merchants will be required by law to limit their purchases of stock to merchandise conforming with recognized safety standards.

When the war is over, and manufacturers again use what are now strategic materials in the production of electrical appliances, it is anticipated that there will be a tremendous wave of production to meet the great backlog of public demand built up during the war. There may be new manufacturers who have not had sufficient electrical experience, and undoubtedly some of the merchandise they produce will fail to comply with safety standards.

Once this wave strikes the market, it will be difficult to regulate it. In order to protect the public against the dangers of unwittingly purchasing appliances constituting a fire or personal injury hazard, it is important that cities enact control legislation now.

It is the plan of the code and ordinance committee to promote the appliance sales ordinance through local chambers of commerce and merchants' associations. The Uniform Electrical Code is promoted through electrical inspectors.

Tackle Knotty Problem

Into a knotty current problem goes PCEA in an effort to help electrical dealers solve a serious business obstacle.

Present OPA price structures forbid the dealer to charge more for repairing an electrical appliance than he charged in March of 1942. In the past, many dealers regarded their appliance service as an incidental part of their main business of selling appliances, and offered repairs to regular customers at very low prices, and sometimes for nothing if the service was minor.

PCEA has made contact with the Los Angeles OPA office and has pointed out this disparity, as well as the war value of dealers keeping appliances in service. Refrigerators are guardians of health. Washing machines must be kept in operation since many commercial laundries refuse to take on additional accounts, because of loss of manpower and increased business from men in the service.

Los Angeles OPA officials requested the submission of a brief, which PC EA is preparing. It will be brought before national OPA authorities qualified to remedy the situation.

In addition, PCEA has enlisted the help of the International Association of Electrical Leagues in the national promotion of the idea.

Spring Meetings

PCEA members will meet the latter part of May at northern and southern meetings to be held in San Francisco and Los Angeles, it was decided by the board of directors at their meeting in Los Angeles Feb. 19. Termed *Electrical Industry War Problems Conferences*, the gatherings will offer more of the stimulating discussions of contemporary matters which have made PCEA gatherings so valuable to the industry. The northern and southern gatherings will present the same program, which is now under preparation by the association's three guidance committees, under the direction of President S. E. Gates.

Who Am I?

I was born Oct. 13, 1880, near Emporia, Kans., where I attended elementary school and high school. My first job was in the printing office of William Allen White's famous weekly newspaper in Emporia. In 1901 I engaged in the promotion of rural telephone service in the Kansas City area, and then became manager of the company that took over ownership of the telephone plant in Springhill, Kans.

In November 1901, I came to California as manager of the New Home Telephone Plant in Ventura. After about six years in telephone management work there and in Santa Maria, I entered the electrical contracting business in Ventura. During the next two years I engaged in the organization of the Ojai Power Co., built the plant in the Ojai Valley, and started its operation on New Year's Eve 1912. I continued for a time as engineer and manager of the company, and in electrical contracting and electrical retailing in Ventura County towns. In 1925 I devoted my time exclusively to the business of the Ojai Power Co., which grew rapidly. This company was sold to the Southern California Edison Co. in 1928.

On June 1, 1929, I came to Visalia as district manager for the Edison Co. In 1932 I was appointed division manager in charge of commercial operations of the company in the San Joaquin Valley, the position I now hold. Who am I?

I am a member of the Rotary Club, Masons, Visalia Chamber of Commerce, and am chairman of the industrial committee of the San Joaquin Valley Council of the State Chamber of Commerce. I have been a member of PCEA for years. I have served on various PCEA committees.

My hobbies are traveling and amateur movies. I have covered about 60,000 miles during the last ten years in this country, Mexico and Canada, and have accumulated about 6,000 ft. of film. I am married, have two children, reside in Visalia and my name is: See page 85.

ELECTRICAL WEST

McGRAW-HILL COMPANY OF CALIFORNIA
68 POST ST. SAN FRANCISCO

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Walking Forward

JUST what kind of an America or, for that matter, what kind of a world we will be living in after the war is a matter for conjecture. One thing is certain—it will be different. There must and will be changes—social, economic and political changes—based upon new outlooks, new conditions and new doctrines.

Many past defects in human relationships will be corrected. These will include the relationships between business and its own people and business and its customers. The degree to which the mutual interests of these groups are consolidated, interpreted and understood, will in no small measure determine the survival of the process we know as the enterprise system. Speaking realistically on the ability of business to preserve this system, Kimball I. Jack, advertising manager of the Washington Water Power Co., said this in a recent issue of *Public Utilities' Fortnightly*:

"Shrewd, too, has been the politician in ignoring our yesterdays, save that the past offers proof of what may be had tomorrow. With his own hands, the politician can, and has, produced little. This barrenness of tangible results has forced him to talk of abundance lying always ahead. This is his one advantage. Where his story is one of futurity, industry constantly seeks to remind the public of what it has done for them in the past. 'See what we have done for you' is the reminder. Thus business is always walking backwards into its tomorrow, and unconsciously creating the mental attitude of stagnation."

In the past the electrical industry has been prone to talk too much about its yesterdays. Today few industries have such a wonderful opportunity to talk about their tomorrows. The promises which the industry can make about its future contributions to better living are not hollow ones either. Unlike the politician, it can make good.

So in preparation for the changing times ahead and to insure preservation of a system of business which can contribute most, let us as an industry "walk forward into our tomorrow."

Revolt Against Bureaucracy

CONGRESS' revolt against government by directives, edicts, orders and mandates issuing from a vast and tortuous overgrown executive bureaucracy finds a sympathetic, hopeful and badly mauled partisan in the light and power industry. Few businesses have suffered more at the hands of bureaucrats and their government-by-executive edict.

No better example of the unfairness of this kind of governmental regulation has developed in recent times than the coalition between the Federal Power Commission and the Bonneville Power Administration to force the Washington Water Power Co. to serve as a Bonneville "carrier." As reported in the news columns of this issue the FPC order contradicts and abrogates an existing contract between Bonneville and WWP. Extension of the principle exemplified in this order would not only constitute destructive competition but also would create chaos. We would like to know how it can be explained to a Congressional committee.

The Villain Still Pursues

TO cast Uncle Sam in the role of the villain is more than a pity. Our enemies across the oceans do that and we resent it. It is not a happy situation when the political ownership crowd in our own country, riding in the seats of the mighty, make of Uncle Sam the relentless, grasping villain who insists upon foreclosing the mortgage in order to take over the property himself, property in whose development and improvement he had no part.

It is that rather dastardly role in which Uncle Sam is being placed as the Securities Exchange Commission pushes liquidation of holding companies and tosses operating companies out into the winter storm to attempt to find refinancing money

to pay off the mortgage. When they fail, because no one wants to risk money in a persecuted industry, there is nothing left but for the "villain" to foreclose the mortgage, take over the property and evict the widowed family that has made that property what it is today.

In Colorado, denied the chance to integrate with other similarly stranded utilities and survive as a private company, Public Service Co. stands between two unwanted suitors, a state power authority and the federal power group, awaiting the outcome of a struggle between the two to determine which it must marry against its will. In Utah the same villain pursues a utility already reeling from attacks in local rate hearings. In the Northwest the PUDs have had passed for them a law permitting them to take up the mortgage which hangs over Washington utilities with promissory notes.

If the early times were days of exploitation by bold buccaneers of business, the empire builders, certainly these times are days of the government high-jack and federal power piracy. At a time when so much depends upon faith in one's government and its adherence to the ideals of its founding, these mercenary acts are tragic. They create a doubt that *such* an America is worth fighting or sacrificing for.

The Industry's Home Front

WHEN young men leave their homes and jobs to go into the armed services they rely upon us of the home front to keep America the place they can return to and find opportunity for work again. In the same way the electrical industry itself has gone to war and it too must rely upon someone who must stay at home, to hold the home front for it so that when war is over it may return to American ways of business life, to opportunity for enterprise.

Since it is the utility that, despite its own contributions to war production, remains at home, serving the home field—residences and small businesses—the responsibility to hold that home front largely must be left with it. While the manufacturers are all-out in war production, distributors diverted to serving war material needs, dealers converted to essential civilian merchandise or into war work of some kind, contractors doing military and war industry work, the utilities alone are at home with their people every day and night.

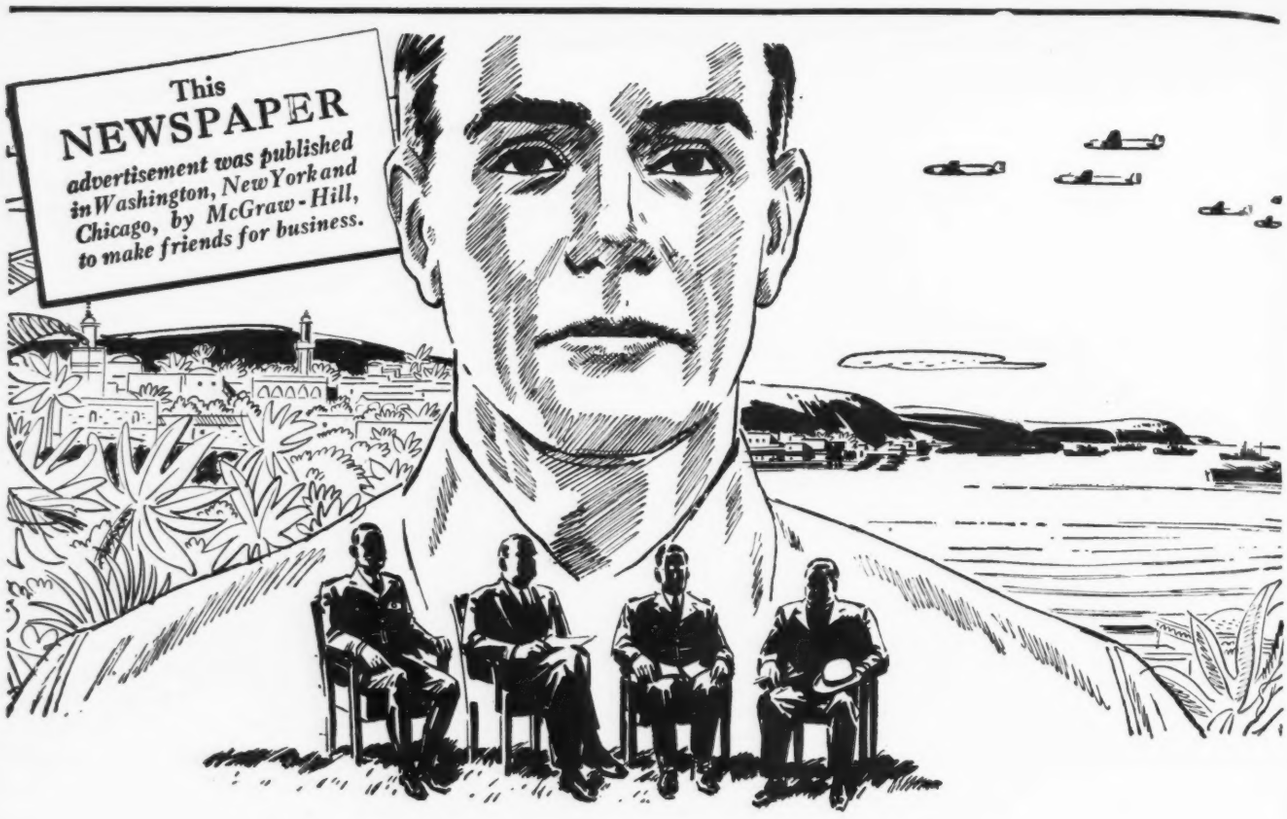
If they give up the fight to keep America a country for private business opportunity, it may not be long before statism moves into manufacture and distribution. The home front will have been lost and the war to defeat dictatorial government and totalitarian authority, even if won on the battlefield, will have been lost where it really matters. The industry may return from all-out effort at war to find its business opportunity stolen by bureaucracy meanwhile.

It is a tremendous responsibility for the utilities to shoulder alone, but it is the hope of the industry and in a deeper sense the hope of America. On the utilities rests the job of maintaining the good name of electrical equipment, keeping alive the ideal of the electrical way of life, keeping rates low and service high, and fighting for the American way of life and opportunity. They must not fail.

Taxing Publicly Owned Utilities

INTRODUCTION of a bill into the Oregon legislature calling for taxation of publicly owned utilities on the same basis as their business managed competitors, brings out sharply a conflict of opposing theories. With present levels of utility taxation, where totals approach and even exceed 20% of gross revenues, the advantage of freedom from taxes in permitting the low rates used to attract the public in the case of publicly owned utilities is self-evident, So too, is the burden that is shifted on other tax-paying enterprises wherever large segments of the utility business go over to government. Legislators must decide sooner or later whether these conditions shall continue. Maybe this will happen in Oregon.

LET me emphasize again the abnormality of present conditions. In the last analysis we have but one customer—Uncle Sam. Not only is he our only customer, but through OPA he fixes the prices at which we shall sell; he determines through WPB what materials we shall have and to what customers we shall deliver and when. He controls the wages and salaries we shall pay . . . sets standards of quality for our products; he tells how we shall keep our books and (what) records he requires us to maintain. Finally he takes in taxes about three-quarters of any profit and reserves the right through renegotiation to take away whatever additional amount he sees fit. . . . These are the new rules of the game. We are playing for high stakes. Let no stockholder or employee complain. . . . For play it we must and win it we will.—Joseph Edward Otis Jr., president, Dodge Manufacturing Co.


This
NEWSPAPER
advertisement was published in Washington, New York and Chicago, by McGraw-Hill, to make friends for business.

* * * * *YOU* * * * *
were at Casablanca

THE interesting thing about this Casablanca business is the terrific wallop our country is packing in international affairs these days.

We've been on the muscle just a little more than a year, now, but the boys who came up through the prelims are already calling us "Champ" . . . and it looks as though the other corner of the ring is beginning to dread the finals.

▶ How come? It wasn't so long ago that Brenner Pass and Berlin meetings were dominating the world's headlines.

YOU made the difference. "You" meaning every American who worked hard last year in America's war industries. Because a statesman, or a general, can only be as good as the industrial strength he represents.

▶ By the very act of shunting America's mighty industries from making peacetime things like automobiles and streamlined trains to making wartime things like ships, bombers and guns, the voices of your representatives were magnified from whispers to thunder in the councils of war.

YOU were at Casablanca (*Cont'd*)

If that makes you feel pretty proud, as a part of the industrial system that is going to burn the bearings of the Axis, maybe you'd better think about what is going to happen to our industry (and, incidentally, to your job) after the war is over.

▶ Things could get in a terrible mess, you know. We'll have the biggest debt in the history of the world, and 10 million soldiers and sailors to find jobs for.

The only thing that will save us will be the last thing most folks will think of—making it easy for business to grow.

If business grows, jobs grow.

Good business is the source of all good living.

America invented the method that produces better living. Here it is:

1. Constantly improve the equipment available for the worker.
2. Use the lowered costs thus produced to
   (a) Lower prices to consumers.
   (b) Improve the standard of living.
   (c) Provide incentives for invention, leadership and investment.
   (d) Lay aside "Seed Money" that can be used to start over again at item 1.

That's all there is to it. That's what gave us the highest living standard on earth. It can take up the job after the war, taking care of you, the soldiers, the sailors, and the war debt—IF it is allowed to operate.

But there are hundreds of laws that gum the works. Both business and labor need laws, the same as any other humans, but they need laws that will *lubricate* the industrial machine.

Let's take two of the gummy ones: There's a law that says a business must take 20 years to charge off a machine. Look what that does to item 2 in our "recipe for good living." Most machines are obsolete in 5 years, and government should encourage scrapping them. Obsolete machines *prevent* lower costs and *keep* wages down.

Another law, the excess profit tax, confuses business profit ("Seed Money") with private profit. In preventing a crop of war millionaires, this law also takes away most of the "Seed Money" that business should be saving for the big expense of converting back to peacetime work.

That law ought to be changed. If you think so, too, ask your congressman to study all laws with this principle in mind:

"*What's Good for Business is Good for Americans*"

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OF INDUSTRIAL COMMUNICATION

22 publications, which gather "war-news" from the "war-production-front" through a staff of 153 editors and 725 engineer-correspondents . . . More than 1,500,000 executives, designers, production men and distributors use the editorial and advertising pages of these magazines to exchange ideas on war-production problems.

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NEWS of the industry

UTILITY TOLD TO WHEEL POWER FOR BONNEVILLE

By ordering the Washington Water Power Co. to wheel power for the account of the Bonneville Power Administration to two Army installations near Spokane, the Federal Power Commission last month acted formally for the first time under the President's directives of last fall which placed upon FPC the responsibility for arranging the cheapest power supply for war installations.

The order states that the BPA had offered to furnish the electric power supply for a 500-kw. pumping installation at Fort George Wright military reservation and a 700-kw. load for the Baxter General Hospital at the cheapest available rate. While Bonneville facilities are not directly connected with either installation, the order points out that Bonneville is interconnected with the Washington Water Power Co. and that the latter is in a position to transmit and deliver electric energy to the station and hospital for the account of Bonneville.

Although the order was vigorously protested by the Washington Water Power, the commission points out that its action is in line with the President's directive of Sept. 26 in which he said: "In many instances it should be possible to lessen power costs if provision is made for power to be supplied to the consuming agencies directly from the power generating agency. If the lines of the lowest cost power supplying agency do not connect immediately with the war plants, there is no reason why connecting lines of other companies or agencies should not be utilized for a reasonable transmission charge."

Kinsey M. Robinson, WWP president, in a public statement declared that "this kind of an order shows how two bureaucratic agencies will lend each other a helping hand to circumvent a contract entered into by one of them, presumably in good faith, in an effort to promote the sale of Bonneville power at the expense of private enterprise." He pointed out that an existing power interchange agreement between his company and Bonneville contains an agreement that WWP will transmit Bonneville power for new government owned and operated strictly wartime loads if each such load exceeds 750 kw. In this instance neither load meets that minimum.

Robinson asserts further that WWP would serve the loads at an over-all saving to the federal government of $4,400 annually. Under its interchange agreement it would pay Bonneville approximately $8,000 annually for 6,420,000 kwh. of dump energy and would also pay a federal income tax of $15,000 from the revenues it would derive at its regular schedules.

The FPC order directs the power company to work out a reasonable transmission charge or the commission will prescribe conditions and compensation. It also states that service shall start immediately and in no event shall be delayed pending determination of the terms or conditions of any agreement between the parties.

Arizona Bill Would Set Up State Power Authority

Considerable controversy has been aroused in Arizona over a State Water and Power Authority bill sponsored by Governor Osborn. The proposed measure aims to set up a state agency with powers to deal with the federal government in bringing benefits from federal development of the Colorado River to the state. It would grant broad powers for engaging in various utility activities.

The law is patterned after the California Water Authority act set up to permit state development and administration of the Central Valley Project. It is held up as the only alternative to ratification of the Colorado River compact as a means of obtaining Colorado River water and power in large quantities for the state. The measure is opposed by many groups, including the Salt River Valley Water Users Assn., which already furnishes water and power to a large section of the state in the vicinity of Phoenix.

Office of War Utilities is Headed by J. A. Krug

Wartime requirements and direction of electric power, gas, water and communication (except radio) utilities rests in the Office of War Utilities with J. A. Krug as war utilities director. Exclusive jurisdiction over these services was conferred on the new agency in an order signed by WPB Chairman Donald Nelson on Feb. 13.

Coincident with the effectiveness of the administrative order Krug announced the appointment of Barclay Sickler as director of the OWU Power Division with Edward Falck as deputy director.

STOCKHOLDERS ACT IN SEC HEARING

A new element in the form of a preferred stockholders committee was injected into the SEC's hearing of Portland Electric Power Co.'s financial reorganization when the hearing resumed in Portland, Ore., Feb. 15. The committee, newly reorganized to represent the 13,000 preferred stockholders of PEPCO, many of them local people, has as its purpose protection of stockholders' interests. The SEC hearing was a continuation of that adjourned from Philadelphia last November.

First step taken by the committee was a request by its attorneys that the SEC subpoena Dr. Paul J. Raver, Bonneville administrator, and William Ditmar and D. R. Marlett of the Bonneville Administration, together with all correspondence, letters, telegrams and other written communications bearing on the Portland General Electric Co. properties. (Portland General Electric Co. is the chief subsidiary of Portland Electric Power Co.)

The subpoena also asks that all correspondence between Dr. Raver and his associates and any member of Congress "pertaining to the promulgation of public ownership" be produced at the hearing. Finally it is requested that "all files, memoranda and data of the Bonneville Administration pertaining to the potential further development of the production of electric energy at (1) Bonneville, (2) Grand Coulee and (3) any other proposed projects in the states of Oregon, Washington or Idaho that would affect the supply of electric energy in the Portland area" be produced.

J. F. Ulrich, real estate dealer of Salem, Ore., is chairman of the stock holders committee. Paul E. Gurske, president of the State Federation of Labor, Portland, is vice-chairman; and Joseph R. Gerber of the Jos. R. Gerber Advertising Agency, Portland, secretary and treasurer. H. B. Beckett of a prominent firm of Portland attorneys is attorney for the committee.

● California Oregon Power Co. has been ordered to make certain accounting adjustments by the FPC as part of an original cost study ordered by the commission. At issue since early in 1942, the items represent intangibles which are now to be amortized over a 10-year period.

WESTINGHOUSE NEW DRY-TYPE TRANSFORMERS

36% copper saving . . . 50% steel saving . . . *and a better transformer!* That is the new Westinghouse Dry-type Distribution Transformer. (Ratings from 1 to 100 Kv-a.)

Three things make this transformer possible:

1. **HIPERSIL***: the new Westinghouse electrical steel that has one-third more flux-carrying capacity . . . saves copper and steel.
2. **CLASS B INSULATION:** permits more Kv-a output with less copper in the windings.
3. Westinghouse Engineering "KNOW-HOW" in pioneering and combining new developments into practical critical material-saving transformers.

The smallest and lightest indoor distribution transformer ever built, this new Westinghouse design adds to the inherent advantages of Dry-Type Transformers:

- **SPACE SAVING . . .** Mount a dry-type anywhere indoors . . . on a shelf, a post, or overhead.
- **TIMESAVING . . .** No fireproof vaults required.
- **IMPROVED VOLTAGE REGULATION and COPPER SAVING . . .** Located at the machine, the dry-type eliminates long heavy secondary runs.
- **NO LIQUIDS** to inspect, change or filter.

J-70399

Ask your Westinghouse Representative for full details on this lighter and smaller transformer. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

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PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

DISTRIBUTION TRANSFORMERS

WASHINGTON LEGISLATURE PASSES PUD INITIATIVE

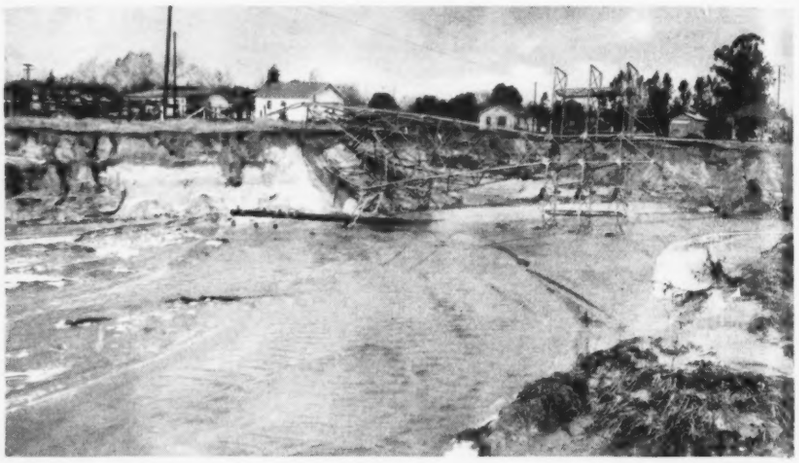
Public utility districts of Washington obtained the first practical medium for taking over integrated privately-owned electric systems when both houses of the state legislature passed Initiative No. 12 last month. Vote in the state senate was 29 to 17; in the assembly, 62 to 37. The bill carried an emergency clause making it effective immediately. However, several possible procedures might delay any proposed take-overs at least two years, or perhaps kill the measure completely.

Pending before the Washington senate was a resolution to put the measure before a vote of the people in the 1944 general election. Also there was every likelihood that court action would be taken testing the validity of the law as an emergency measure and that referendum proceedings would be instituted to force submission to popular election.

The measure provides that commissioners of any two or more adjacent PUD's may by resolution form joint commissions for the acquisition of electrical facilities upon a system wide basis. Financing is to be accomplished solely by revenue bonds. Gross revenue taxes in lieu of ad valorem levies are set up on bases ranging from 5.6% for energy generated by a district and sold to ultimate consumers to 2% on revenues from energy purchased for resale. The law also gives such commissions the right of eminent domain. Except for the power to tax or to issue general obligation bonds or warrants the commissioners of the new super-districts are granted all of the powers conferred upon PUD commissioners in the original laws passed in 1931 and 1941. As a final provision the law permits two or more joint commissions to form an authority or super-super district for the operation of interconnected properties.

Opponents of the measure pointed out that it contributes nothing to the war effort, that it removes the already independent PUDs even further from control of the people and that it grants complex powers to individuals having no special qualifications. The fact that the initiative was directed to the legislature rather than to the electorate was also the subject of speculation.

● ELECTRIC RATES of the Albuquerque Gas & Electric Co. were reduced $140,000 in an order issued by the New Mexico Public Service Commission. Effective date of the new schedules, which apply mainly to residential and small commercial customers, is Apr. 1.



When a flood-swollen creek changed its course near Colton, Calif. late in January, this Southern California Edison Co. transmission tower carrying two 66-kv. and one 23-kv. lines fell into the newly cut streambed, as did an 11-kv. distribution pole. The tower was located 41 ft. and the pole 15 ft. back from the original bank of the stream—a bank 20 ft. high. Gale-like winds and torrential rains hit everywhere on the Edison system, except in the San Joaquin valley, causing about $200,000 damages. Hardest hit was the distribution system, with 3,770 house services and 350 poles down. About 600 cases of trouble occurred on 16,000 and 11,000-volt lines and 1,250 on 4 and 2.3-kv circuits. No interruptions occurred on the main 220-kv. transmission system

Hearings Concluded in Utah Power & Light Rate Case

Valuation hearings before the Utah Public Service Commission, aimed at reductions in the rates of Utah Power & Light Co. were concluded Feb. 9 after 36 days of taking testimony. The case started Nov. 16, 1942. In the interim 3,629 pages of testimony bearing on the original cost and other valuation factors were compiled for the record.

The state, together with the Federal Power Commission, contends that reductions of upwards of $2,000,000 annually should be made by the company, based upon their valuations. The company holds otherwise, citing higher valuations. Figures ranging from the $64,000,000 which the state asserted was a fair value, to $95,859,000 which was the trended dollar value established by a company witness, were included. A reproduction cost new figure of $107,000,000 presented by the company was disallowed by the commission on the grounds of irrelevancy.

Following the conclusion of the hearing questions were raised in Congress over the right and authority of the Federal Power Commission experts to participate. Chairman Leland Olds of the FPC testified at a committee hearing that commission personnel appeared as expert witnesses upon invitation of the Utah commission.

Later a committee representing preferred stockholders filed appeals with the commission and the Utah governor seeking protection of their rights in any action that might be taken.

PUD May Operate Outside Boundaries, Court Rules

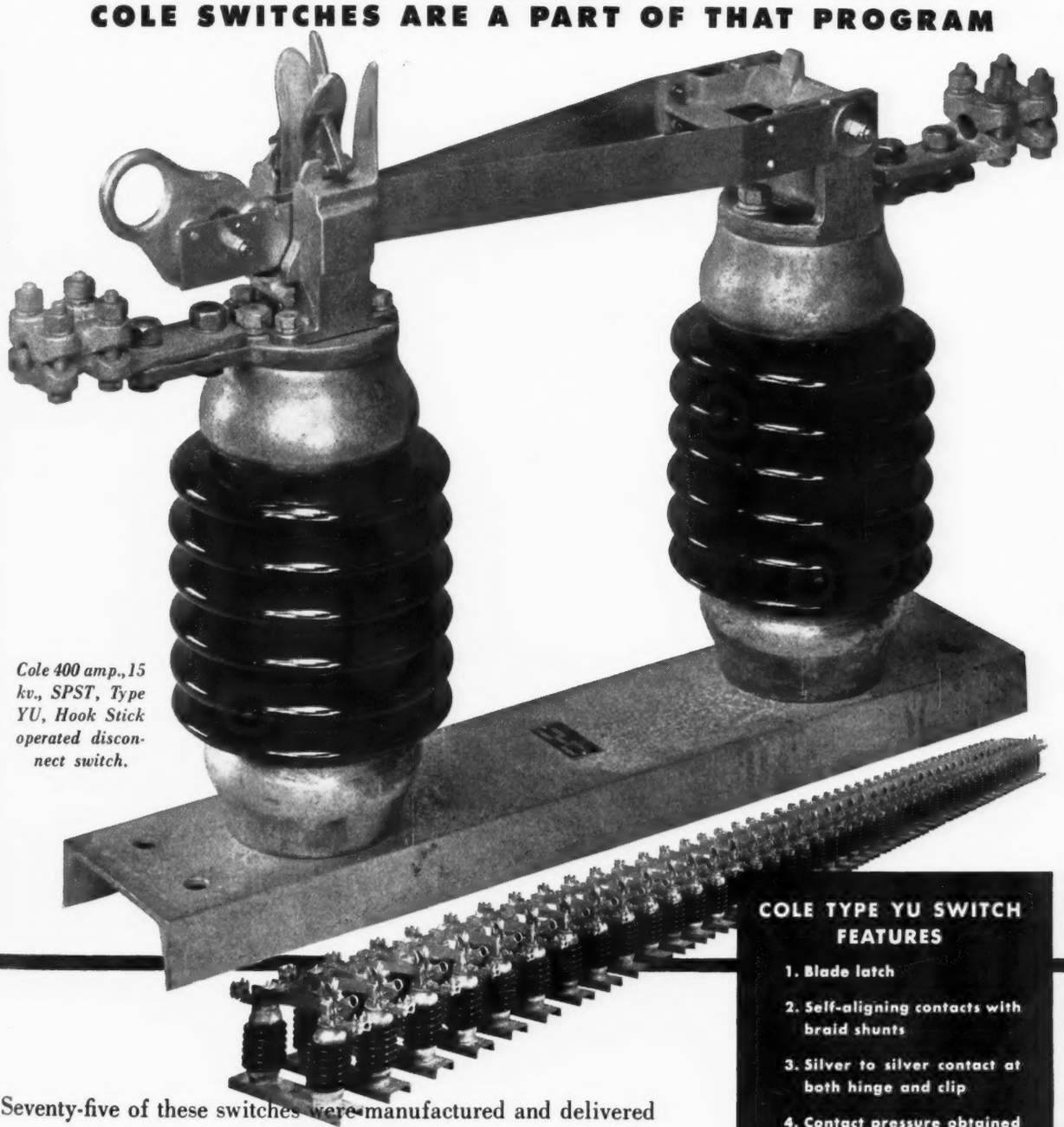
Oregon PUDs may operate outside their legal boundaries and may use revenues derived from such operations in paying off revenue bonds according to a decision of the Oregon State Supreme Court. The court ruled in a suit brought to test the right of the Lincoln County PUD to use $735,000 of revenue bonds for the purchase of facilities of the West Coast Power Co. in Lincoln, Lane, Douglas and Coos counties along the Oregon coast.

Only a small portion of the system is located within the boundaries of the Lincoln PUD, which embraces an 18-mile strip of coastline including the towns of Newport, Toledo and Waldport. Outside the area are several large towns and industrial customers which must now take service from the PUD.

Meanwhile the West Coast Power Co. has sought authority from the Federal Power Commission to sell its coast facilities to the PUD. Bonneville Power Administration will supply the district with power.

SYNTHETIC RUBBER IS A *MUST*

COLE SWITCHES ARE A PART OF THAT PROGRAM



Cole 400 amp., 15 kv., SPST, Type YU, Hook Stick operated disconnect switch.

COLE TYPE YU SWITCH FEATURES

1. Blade latch
2. Self-aligning contacts with braid shunts
3. Silver to silver contact at both hinge and clip
4. Contact pressure obtained by preloaded springs
5. Exceptionally low temperature rise

Seventy-five of these switches were manufactured and delivered in four weeks from date of order. Cole Switches, both indoor and outdoor types, are manufactured for all voltages and amperages. *We will be glad to answer any specific questions which you have.*

Cole Electric Company

1510 SOUTH LOS ANGELES STREET, LOS ANGELES, CALIFORNIA

Western Representatives: CONDON & YOUNG, INC. 357 SOUTH HILL STREET, LOS ANGELES • EICHER & BRATT COLMAN BLDG., SEATTLE, WASHINGTON

1¼ MINUTES READING TIME

OSMOPLASTIC

PROTECTS YOUR POLES FROM GROUNDLINE DECAY

Here's How:

1 Dig earth from around pole to a depth of about 14 inches from groundline. Then remove loose decayed wood in the treatable zone.

2 Apply OSMOPLASTIC by brushing or daubing on the cleaned surface from 6 inches above to 12 inches below the groundline level.

3 Wrap Osmose bandage around treated area. This protects and retains the Osmoplastic until the Osmosalts penetrate into pole.

4 Back-fill the hole and the operation is completed. The Osmoplastic protection adds many extra years service to standing poles.

Osmose Wood Preserving Company of America, Inc. Dept. C
1437 Bailey Avenue, Buffalo, N. Y.

Please send me the new Osmoplastic Bulletin on groundline treating utility poles for *extra* years of service life.

Name_____

Address_____

City and State_____

OSMOSE
WOOD PRESERVING
COMPANY of AMERICA, Inc.
DENVER
SEATTLE • BUFFALO • SAN FRANCISCO

RATIFICATION SOUGHT ON COLORADO RIVER COMPACT

Efforts to secure Arizona's ratification of the Colorado River Compact, the initial document allocating benefits from that stream to upper and lower basin states, have been renewed with the introduction of a bill in the Arizona legislature. An earlier legislature had enacted a measure ratifying the compact conditioned upon obtaining an agreement between California, Arizona and Nevada as provided in the Boulder Canyon project act. However, the tri-state agreement was never made.

The Boulder Canyon project act is recognized as the law governing development of the river. It specifies that water division between Arizona, Nevada and California is to be based upon rules to be incorporated in an agreement between the three. Such an agreement has never been reached, principally because of the failure of Arizona and California to effect a compromise. Arizona still charges that California has received the major benefits from Colorado River development thus far and that California does not want the compact ratified.

Puget Sound Gets Approval on Wartime Interconnections

War emergency use of interconnections in Washington between Puget Sound Power & Light Co., Washington Water Power, City of Seattle and Bonneville will not affect the status of Puget Sound under the Federal Power Act, it was ruled last month by the Federal Power Commission. Commission approval of the interconnections was requested by Puget Sound in an application filed under emergency power granted the commission by Section 202 (d) of the Federal Power Act.

Excluded from the order is normal use of three interconnections with Washington Water Power which were established primarily to supply power to the electrified section of the Chicago, Milwaukee, St. Paul & Pacific Railroad. Two proceedings pending before the commission involve the status of Puget Sound as a public utility under the Federal Power Act by reason of its ownership and use of these interconnections.

Under the order, Puget Sound must file with the commission copies of each of its interchange agreements and report to the commission monthly the amounts of electric energy received and transmitted in each direction through the interconnections.

WARTIME

FLUORESCENT INDUSTRIAL

MEETS NEW THREE POUND STEEL LIMITATION ORDER

New in design—New in Principle—Precision built —Engineered to give the finest in lighting.

So unusual is this fixture that it can be surface-chain—or pipe mounted individually or in continuous runs with the greatest simplicity.

Entire wire way is of rigid metal construction and may be completely exposed for easy installation or maintenance. Reduces costs.

Ballast inverted under channel, is completely exposed for longer life and cooler operation.

Reflectors of Masonite are formed and finished in our plant, under controlled conditioning.

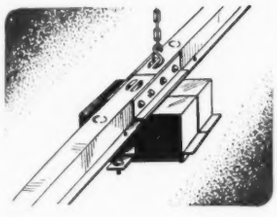
Louvres of Masonite, white enameled and may be added where shielding is desired.

Underwriters Laboratories Approved

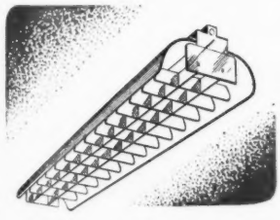
40-A-SERIES for 2-40w, 3-40w, 4-40w, 2-100w, and 4-100w, fluorescent lamps.

WRITE TODAY FOR COMPLETE FACTS ON THIS NEW WARTIME LIGHTING SERIES

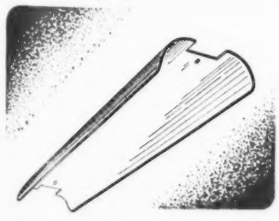
LIGHTING PRODUCTS, INC.
HIGHLAND PARK, ILLINOIS



When Used in Continuous Runs — L bars are provided, making the entire run rigid . . . Remove socket covers and connect fixtures with nipple, which gives a complete wiring channel.

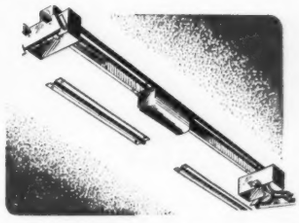


Where Lamp Shielding Is Required — Louvres of masonite, finished in klasium white . . . May be added. Designed for proper light cut-off and are easily attachable.

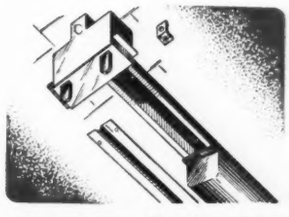


Reflectors Are of Masonite—Formed under controlled conditioning, in our own plant—which produces permanent shapes that stand up under the most adverse humidity conditions . . . Finished in klasium white.

FACTORY REPRESENTATIVES WANTED — SHOULD KNOW THE ELECTRICAL TRADE,—AS WE SELL THROUGH DISTRIBUTORS ONLY.



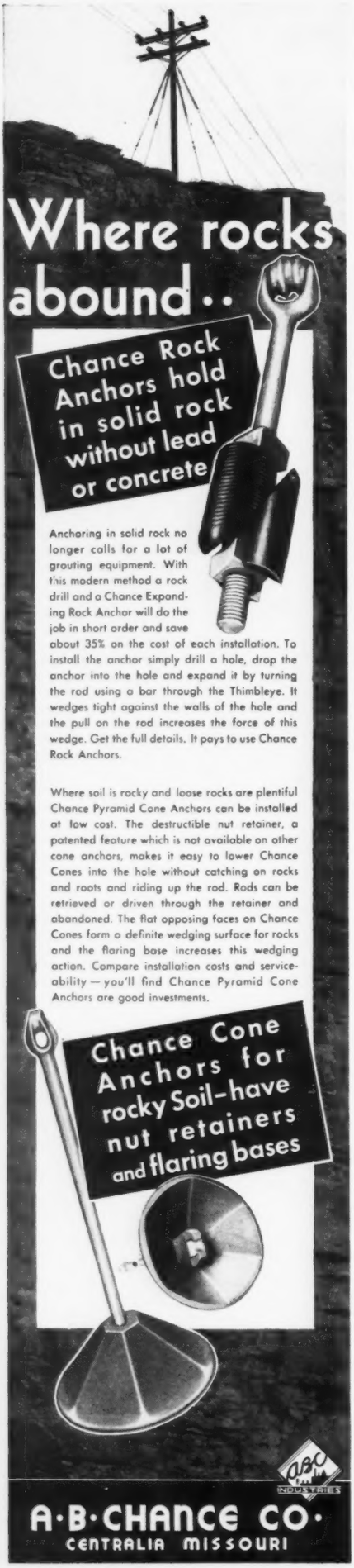
Note — Entire wiring channel may be exposed quickly — including lamp holder cover, without disturbing wiring assembly . . . Simplifies installation or maintenance and reduces costs.



For Surface Mounting—Ballast is swung under channel, leaving top of fixture clear to flush on ceiling. Channel is easily accessible for ackerman . . . Screw or box mounting.

Conforms to new W. P. B. 3 pound steel limitations order . . . A 75% or better saving of strategic material so vitally needed for war effort.

FACTORY REPRESENTATIVES WANTED — SHOULD KNOW THE ELECTRICAL TRADE,—AS WE SELL THROUGH DISTRIBUTORS ONLY.


Where rocks abound..
Chance Rock Anchors hold in solid rock without lead or concrete
Anchoring in solid rock no longer calls for a lot of grouting equipment. With this modern method a rock drill and a Chance Expanding Rock Anchor will do the job in short order and save about 35% on the cost of each installation. To install the anchor simply drill a hole, drop the anchor into the hole and expand it by turning the rod using a bar through the Thimbleye. It wedges tight against the walls of the hole and the pull on the rod increases the force of this wedge. Get the full details. It pays to use Chance Rock Anchors.
Where soil is rocky and loose rocks are plentiful Chance Pyramid Cone Anchors can be installed at low cost. The destructible nut retainer, a patented feature which is not available on other cone anchors, makes it easy to lower Chance Cones into the hole without catching on rocks and roots and riding up the rod. Rods can be retrieved or driven through the retainer and abandoned. The flat opposing faces on Chance Cones form a definite wedging surface for rocks and the flaring base increases this wedging action. Compare installation costs and serviceability — you'll find Chance Pyramid Cone Anchors are good investments.
Chance Cone Anchors for rocky Soil-have nut retainers and flaring bases
A·B·CHANCE CO·
CENTRALIA MISSOURI

NORTHWEST SAYS "NO" ON UTILITY TAKE-OVER

Residents of Oregon and Washington recently showed themselves more than four to one against wartime adoption of the proposed Bone-Smith Columbia Power Administration bill introduced in the last Congress, and nearly two to one against such a change in the Northwest power set-up at any time. This sentiment was disclosed in a public opinion survey conducted for a group of Pacific Northwest electric companies by Dan E. Clark II and Associates.

The survey also showed that opinion in the two states is more than eleven to one in favor of deciding the public ownership question by vote of the local communities affected rather than by Congress. Present electric rates are considered reasonable by a margin of five to one.

Direct interviews with a representative cross-section of people in the two states revealed only 13.7% favorable to making a change in the Northwest power set-up now. In contrast 63.3% said they believed any change should be postponed until after the war. Twenty-three per cent expressed no opinion.

The study was characterized as being "as painstakingly accurate as any I have had the opportunity of analyzing" by Dr. Chilton R. Bush, executive head of the Stanford University department of journalism and survey consultant.

Basic question asked in the survey was: "Do you think this proposed Columbia Power Administration should or should not be given authority to buy or condemn and take over every electric power company in Washington and Oregon?"

Answers showed opinion nearly two to one against authorizing such power company take-overs. The division was as follows:

Should	24.0%
Should not	46.1
No opinion	29.9

A breakdown of results by states showed that opinion in Washington, which has many PUDs organized, parallels that in Oregon, where the people have been slow to form such districts. By states, the answers to the authority question were:

	Washington	Oregon
Should	24.2%	23.6%
Should not	45.5	47.1
No opinion	30.3	29.3

Even the minority approving the take-over idea returned a 51.9 to 36.1 majority in favor of postponing such action until after the war.

Rural residents were 24% for and 46.1% against the proposal, with 29.9% no opinion.

Areas in which PUDs have been organized but are not yet operating were within a few tenths of one per cent of the over-all results for the two states.

Seattle, which has competing city-owned and private electric systems, likewise was close to the general pattern, with 22.5% for and 43.5% against the take-over idea, 34% no opinion.

Analysis of interviews according to occupations of heads of families showed laborers (constituting nearly half the sample), 22.8% for the take-over proposal, 44.6% against, 32.6% no opinion; white-collar workers, 11% for, 56.6% opposed, 32.4% no opinion.

Professional and business people were 25.3% for, 53.9% against the proposal, with 20.8% expressing no opinion. Farmers and farm laborers (excluding non-farm rural residents) were 31.8% for, 46.7% opposed, 21.5% no opinion.

Breakdown by incomes showed the lowest income group divided 22.4% for and 43.1% against the take-over idea, with 34.5% no opinion. The middle income group was 25.6% for, 46.5% against, 27.9% no opinion. In the upper bracket the division was 21% for, 56.1% against, 22.9% no opinion.

Only 7.5% of those questioned expressed willingness to have the public ownership question decided by Congress, compared with 83.7% who said it was a matter for community decision by a vote of the people. Only 8.8% voiced no definite answer.

● CITY OF SEATTLE has sold its $7,000,000 Ross Dam bond issue to Drumheller-Ehrlichman Co. Largest issue the city has ever sold, the bonds brought $6,849,500, effective interest rate being 2.6617%. Contract for construction of the proposed dam extension was awarded to General Construction Co. of Seattle, J. F. Shea Co., San Francisco and Morrison-Knudsen Co., Boise for $7,144,922.

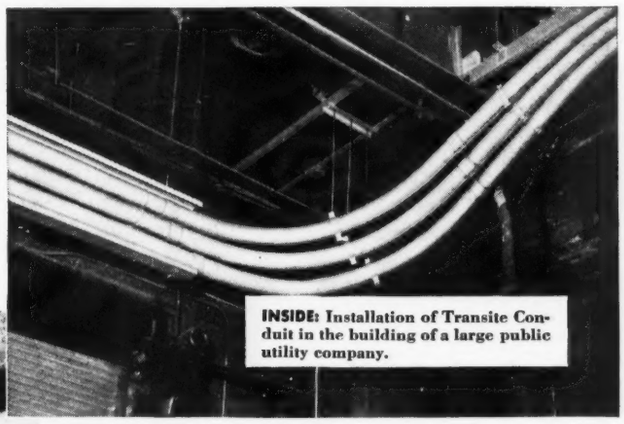
● IVAN BLOCK, chief of Bonneville's market development office, was in Washington, D. C., last month conferring with Department of Interior and War Production Board officials on proposed Northwest alumina operations. Manufacture of aluminum oxide from Pacific Northwest clay deposits has been under study for more than three years.

● TWO-WAY RADIO is being installed on service cars and trucks of Seattle City Light to facilitate communication in emergencies.

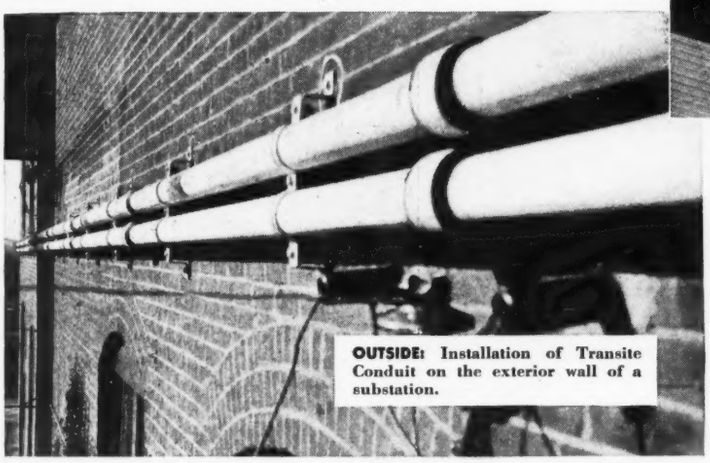
WPB Order L-225 does not apply to this modern type of Conduit...

when used Inside, Outside or Underground

J-M TRANSITE CONDUIT is a non-metallic duct offering strength, incombustibility, permanently smooth bore, elimination of electrolysis problem and ease of installation...



INSIDE: Installation of Transite Conduit in the building of a large public utility company.



OUTSIDE: Installation of Transite Conduit on the exterior wall of a substation.

UNDERGROUND: Installation of Transite Conduit for power, street lighting and signal cables.

CURRENT RESTRICTIONS imposed by General Limitation Order L-225 on the manufacture, delivery and installation of electrical conduit, tubing and raceways—do *not* apply to Johns-Manville Transite Conduit when used inside, outside or underground.

This modern type of Conduit offers many advantages for use in fire and traffic signal systems, private right-of-way installations, and underground service connections to residential and commercial buildings.

Transite Conduit is so strong that it needs no protective casing underground; withstands earth loads and traffic pressure. When "concreting in," use Transite Korduct—thinner-walled, lower-priced, otherwise identical with Conduit.

For complete details on J-M Transite Ducts, write for Data Book DS-410, Johns-Manville, Los Angeles, San Francisco or Seattle.

Johns-Manville

TRANSITE DUCTS

TRANSITE KORDUCT— for installation in concrete

TRANSITE CONDUIT— for exposed work and installation underground without a concrete encasement

Federal Sealed Arc
SAFETY FACTORS

PREVENT PRODUCTION SLOWDOWNS

Switch failures slow up production. That's why Federal "Sealed Arc" Safety Switches* are built with extra safety factors to insure continuous, dependable, trouble-free operation on essential circuits. Federal's "Sealed Arc" construction, for instance, is a confining porcelain "straightjacket" with ribbed arcing chutes that break up and snuff the arc before it can do damage.

Other safety factors that are making Federal switches "musts" with more and more manufacturers are:—dead front shields over live parts, high grade insulating material throughout, ample spacing between live and grounded parts, unobstructed wiring, rugged construction to insure permanent alignment of working parts, and patented "grip-tite" fuse clamps for better connections. Follow the leaders—for extra service and safety switch to Federal!

*"Sealed Arc" construction up to 200 Amperes. 400 to 1200 Amperes Knife Blade Type.

For Complete Safety Switch Data

write for Catalog 42. Contains all the essential facts on Types A, C and D Federal "Sealed Arc" Safety Switches.

SAN FRANCISCO 1264 Folsom Street UNderhill 2367-8
PORTLAND, ORE. 121 N.W. Fifth Ave. ATwater 5355 BEacon 4380
LOS ANGELES 440 Seaton Street MUtual 7087

FEDERAL ELECTRIC PRODUCTS COMPANY
64 PARIS STREET, NEWARK, N. J.

PANELBOARDS • SWITCHBOARDS • SAFETY SWITCHES • CIRCUIT BREAKERS

INVESTIGATION ORDERED ON NISQUALLY PROJECT

Request of Commissioner R. D. O'Neil for authority to increase expenditures at the second Nisqually project by approximately $3,500,000 last month brought a city council order for a full examination of the development.

It was pointed out that, if granted, the request would result in a total project cost of approximately $17,600,000 as compared with an original estimate of $11,000,000 made less than two years ago.

Underestimates and war boom prices together with unforeseen geological faults and necessary changes in design were given as reasons for the increase, which would amount to about 59%.

Alco Cedes Public Patents on Use of Armor Rods

Transmission line engineers will be interested in the fact that U. S. Patents No. 1,639,820 and No. 1,873,798, held by the Aluminum Company of America, covering the use of armor rods were given to the public recently. A deed of public dedication has been filed by ALCOA and recorded in the U. S. Patent Office in Washington. This makes available to all, for all conceivable uses, and without the need for licensing procedure, a practice which has previously been employed largely with a single type of transmission line cable.

Armor rods resemble an extra layer of heavy strands covering the cable for a short distance at points of support. Invented originally for the purpose of protecting cables from fatigue produced by resonant vibration, they increase the resisting moment of the cable at the point of support. This not only reduces stress by distributing the bending but also strengthens the cable in the region of maximum bending stress. They also reduce amplitude of vibration to a considerable extent. A contingent advantage of considerable value is the protection of the cable from flash-over burns.

Experience has shown that armor rods have a distinct usefulness in the field of maintenance, particularly for old lines where the conductor has suffered abrasion resulting from loose ties, burns from flash-overs, or broken strands from vibration fatigue. Armor rods are installed over the damaged area and suspension clamps or insulator ties replaced over the layer of rods, thereby adequately restoring the tensile strength. Considerable time and material may be saved in the rehabilitation of old lines,

G. H. Ryan, salesman, Hendrie & Bolthoff Manufacturing and Supply Co., Deadwood, S. Dak., G-E distributor, feels confident of giving customers good service regardless of gas rationing by using his horse, Dakota Ranger, to supply transportation, if necessary.

★ ★ ★

E. G. Lund (center), lighting specialist, General Electric Supply Corporation, Buffalo, N. Y. and F. J. Button (left), and Elmer Harvey, G-E Supply Corp. salesmen, are choosing lighting and wiring materials to recommend for installation in new local war project.

★ ★ ★

L. G. Gloor (center), manager, Crescent Electric Supply Company, Burlington, Iowa, G-E distributor, is discussing wiring materials suitable for war jobs being handled by customers with Crescent salesmen, T. W. Kelley (left), and P. F. Rohner.

All Over the United States G-E WIRING MATERIALS DISTRIBUTORS

Want to Help with War Projects

The General Electric Wiring Materials Distributor located near you is eager to co-operate with you in aiding the war effort. Call on him for wiring materials needed for wiring system maintenance . . . for wiring conversion . . . for new war project wiring. More than 175 G-E Wiring Materials Distributors are serving customers in different parts of the country.

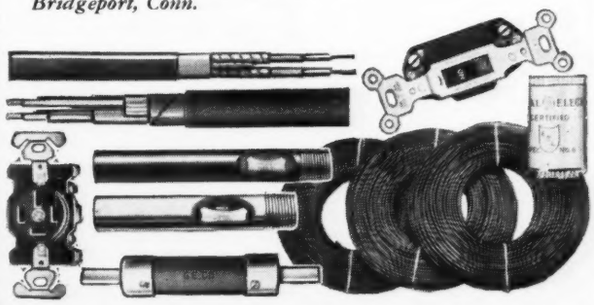
The complete G-E line of raceways, boxes and fittings, wires and cables and wiring devices handled by your G-E Wiring Materials Distributor includes various materials suitable for your war jobs. They are high quality materials, too, easy to work with and sure to give your customers dependable service.

Ask a representative of your G-E Wiring Materials Distributor to visit you. He'll help you select materials . . . help plan special wiring . . . schedule deliveries for materials you need. Everything possible will be done to help you on war project wiring jobs.

Thirty-one General Electric Wiring Materials District Representatives help distributors serve customers. This is R. O. Snyder, who covers parts of Arkansas, Illinois and Missouri.

G-E WIRING MATERIALS INFORMATION

See your G-E Wiring Materials Distributor for full information on G-E conduit, wire and cable and wiring devices to meet your special needs. Appliance and Merchandise Department, General Electric Co., Bridgeport, Conn.



GENERAL ELECTRIC

THIS NAME
ON A STARTER

FS-2 for 15 and 20-watt lamps

FS-4 for 30 and 40-watt lamps

Pat. Nos. 2200443-2228210

Listed and approved by Underwriters' Labs. Inc., and Canadian Engineering Standards Assoc. Certified by Electrical Testing Lab., Specification 6.

What It Means

The name "Lloyd" means a starter which is approved by fixture makers and all who sell fluorescent lighting equipment the country over. A starter which starts quickly and more surely MORE TIMES because it is built for longer life.

It brings you an all-time high in fluorescent efficiency. Keeps peak lighting loads at the peak.

LLOYD NO-BLINK STARTERS

FS-4 NA Stops flickering and blinking of defective and wornout lamps. Operates at full efficiency over a longer time.

LLOYD PRODUCTS COMPANY

Dept. EW-3 Providence, R. I.

Representatives—Branch Offices—Warehouse Stocks in 23 Leading Cities

MARWOOD

Manufacturers' Representatives and Distributors

BROWNING MFG. CO.
"V" Drives—Paper Pulleys—Pivoted Bases

CONTINENTAL-DIAMOND FIBRE CO.
Fibre—Dilecto—Celoron—Vulcoid—Micabond

ROCKBESTOS PRODUCTS CORP.
Heat Resisting Wire and Cable

H. B. SHERMAN MFG. CO.
Connectors—Lugs—Terminals

U. S. GRAPHITE CO.
Motor and Generator Brushes

MARWOOD LIMITED

357 Ninth St., San Francisco, Calif.

Los Angeles Portland Seattle

USBR ISSUES REPORT ON 1942 ENERGY OUTPUT

More than seven and one-fourth billion kilowatt-hours of electric energy —most of it for war purposes—was produced in 1942 by Bureau of Reclamation power projects in the 11 Western states, according to a USBR report. The 1942 output showed an increase of 75% over 1941 production.

Plant additions at the close of 1942 and beginning of 1943 enable the projects to operate at the rate of nine billion kilowatt-hours annually and this rate will be increased to 10 billion kilowatt-hours by midsummer, the report disclosed.

Total capacity of power plants on USBR projects was increased nearly 50%, from 1,114,562 kw. on Dec. 7, 1941 to 1,642,000 kw. early in January 1943.

Installations approved for 1943 will increase total capacity to more than 2,000,000 kw. and another 500,000 kw. is scheduled for the spring of 1944.

Included in the 1943 schedule are installation at Grand Coulee of two 108,000-kw. generators and two 75,000-kw. units originally constructed for Shasta Dam. Green Mountain power plant in the Colorado-Big Thompson project is scheduled for operation in April.

Surplus Copper Wire Stocks Released for Rural Lines

Until Apr. 1, utilities may use "surplus" stocks of copperweld-copper and amiductor wire in construction of urgent rural electric "power-for-food" farm extensions previously authorized under terms of Supplementary Order P-46-c.

The copper-steel conductor may be used only with specific WPB permission granted in individual cases, where reasons can be shown why construction of an extension should not be delayed until steel wire is available. The original P-46-c limited extensions to steel wire primaries but adequate stocks are not available during the first quarter. WPB has allocated steel to wire mills for the manufacture of wire for this rural lines program and this stock is expected to become available in the second quarter.

Where steel wire is available, rural construction within the limits of the order may still proceed.

● TWENTY-FOUR MILLION pounds of copper were turned over to the government in 1942 as a result of salvage programs conducted by electric utilities, it was reported by the Edison Electric Institute following a survey of member companies.

Nearly 40 per cent of industry's younger workers have eye defects! The eyes of all employes suffer strain and fatigue under inadequate illumination. Read how MILLER LIGHTING can help you eliminate plant accidents, layoffs and lost time . . .

Under today's terrific pressure men with perfect vision work fast and accurately only with adequate illumination. But remember...a high percentage of industry's workers do *not* have perfect vision! They can do all expected of them...*all they want to do*...without accidents or slowdowns, only if you help them see clearly and sharply at all times.

MILLER 50 FOOT CANDLER or 100 FOOT CANDLER, the *original* continuous wireway fluorescent lighting systems, can provide your war-manpower with adequate, man-made *daylight* for better, faster, safer production. Or, MILLER can provide modern incandescent or mercury lighting, depending on your plant's set-up and particular problems.

Because of this the MILLER field engineer is in an unbiased position to work with you right now . . . to cooperate intelligently in the fine work you are now doing to help speed Victory.

THE MILLER COMPANY MERIDEN, CONNECTICUT

ILLUMINATING DIVISION • Fluorescent, Incandescent, Mercury Lighting Equipment

OIL GOODS DIVISION • Domestic Oil Burners and Liquid Fuel Devices

ROLLING MILL DIVISION • Brass and Phosphor Bronze in Sheets, Strips and Rolls

WAR CONTRACTS DIVISION War Materiel

MILLER Since 1844

Electrical equipment aboard ship has no off-duty time. Resistors in control circuits must be dependable to function at all times. Ward Leonard Vitrohm Resistors measure up to their responsibilities. Their ability to withstand moisture, temperature change, shock and vibration makes them particularly well fitted for general industry as well as for sea duty. Send for data sheets.

WARD LEONARD

Electric control (WL) *devices since 1892.*

WARD LEONARD ELECTRIC COMPANY, 68 South St., Mount Vernon, N .Y.

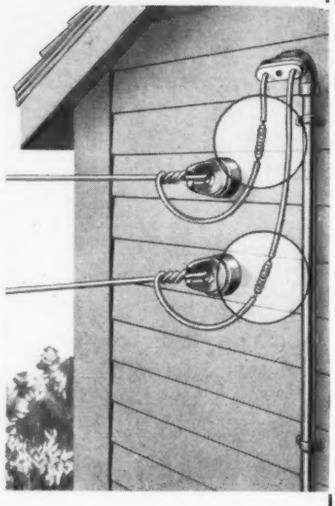
SAVE TIME AND TROUBLE—MAKE YOUR HOUSE CONNECTIONS WITH *Nicopress* SLEEVES

Their Use Assures:

- Completed splices that are neat in appearance and **easy to tape.**
- Joints that are easily made with the light, compact Nicopress Tool.
- Connections that are positive.
- Splices that are strong and tight.

Nicopress is the simplest and most economical method of making House Service Connections.

The sleeves used are standard Nicopress sleeves except shorter than the line wire sleeves.



ORDER FROM YOUR JOBBER

THE NATIONAL TELEPHONE SUPPLY CO.

5100 Superior Avenue, Cleveland, Ohio

Western Representative—J. E. Winchester, 1101 So. 4th St., Alhambra, Calif.
Canadian Mfr., N. Slater Co., Ltd., Hamilton, Ont.
Export Distributor—International Standard Electric Corp., New York, N. Y.

ESSENTIAL OCCUPATIONS LIST REVISED BY WMC

War Manpower Commission and Selective Service have reaffirmed in a revised Occupational Bulletin No. 9 the essential nature of most of the electric utility occupations which were held to be in support of the war by the latter agency last spring. Employees holding the jobs listed are eligible for consideration for 2A occupational deferments when their draft numbers come up.

Although the list of 86 occupations which Selective Service originally considered cause for occupational deferment has been reduced to 51, broader WMC definitions for a number of categories make the amended list cover most of the original jobs.

An unofficial title-by-title comparison of the original and revised bulletin has been completed by the Council of Electric Operating Companies after consultation with WMC officials. Copies of this comparison are being sent by the council to all utilities having 4,000 or more meters and may be secured upon request from the organization's Washington office.

The comparison shows that only a handful of classifications have been eliminated entirely—for instance, service or work dispatcher, oiler, oil purification operator, stockkeeper. Several completely new categories have been added, such as audit accountants, training program instructor, radio technician.

Most important deletions, being applied to all industries, are department heads and assistants in non-operating and non-technical departments, principally those concerned with sales, promotion, rate structure and legal tax, clerical and insurance matters.

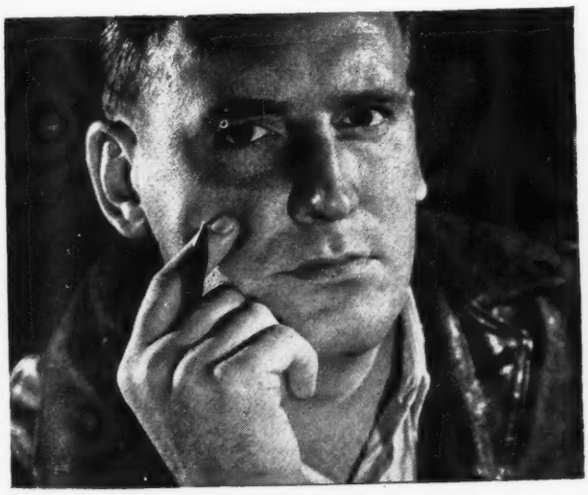
● WITH A VIEW TO RELIEVING the shortage of fuel in Vancouver, the B. C. Electric Railway Co. has commenced cutting wood at Hayward Lake. The company's own gangs are operating with a power saw and are shipping wood from the lake to Vancouver. Orders are being handled by the coke department of the B. C. Electric which is unable to supply its regular coke customers.

● FOLLOWING DELAYED ACCUMULATION of snow in the mountains, the pack at elevations above 7,500 ft. in the Sierra was from six to nine feet deep on Feb. 10, according to information released in the California Cooperative Snow Surveys. The survey revealed that for the Sierra as a whole the Feb. 1 snow pack was approximately 58% of the normal seasonal total.

CARBON LOVES THE WAR!

1 Carbon is having a field day. *All* the trucks in America, including yours, are working longer hours and carrying heavier loads to speed victory. There's more chance for carbon to form—more chance for carbon to waste gasoline, cause sluggishness and breakdowns.

2 But there's a common sense way to *fight* carbon! Many truck owners today are switching to UNACAL TRUCK-BUS MOTOR OIL because it *contains less of the elements that cause carbon.* It is a solvent-refined, 100% pure paraffin-base oil.



3 And that isn't all. Unacal Truck-Bus Motor Oil is an all-around lubricant. It was developed to give balanced performance, to do every job you want it to do ...*right!* It is unusually stable, stands up under a terrific pounding, keeps motor wear at a minimum.

4 So while you're thinking about it, call your Union Oil Resident Manager for a supply of Unacal Truck-Bus Motor Oil. He'll see that you get prompt delivery and friendly, courteous service.

UNION OIL COMPANY

TAKE THIS TIP! When you buy petroleum products buy enough to last. It will protect you against transportation tie-ups and will insure you of an adequate supply of the products you need.

OIL IS AMMUNITION —USE IT WISELY

for CONTRACTORS and INDUSTRIAL PLANTS, it's

TRICO

FUSE PULLERS

For cheap insurance against accidents, shock, burns, infection use a TRICO FUSE PULLER. Install them on all jobs. Write for Bulletin No 5

TRICO

KLIPLOKS

Lock like a vise! They eliminate:
- Unnecessary shutdowns
- Premature fuse blowings
- Wasted current
- Night and holiday repairs

Install KLIPLOKS everywhere.

WRITE FOR BULLETIN No. 6

COAST REPRESENTATIVES

W. E. Young Co., 1944 Broadway, Denver
H. H. Van Luven, 307 E. 3rd St., Los Angeles
Albert S. Knight, 3006 Western Ave., Seattle
Pacific Industrial Products Co.
9th & Harrison Sts., Oakland, California

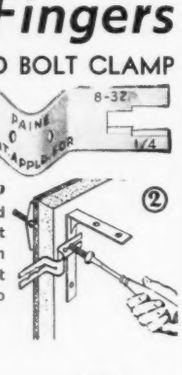
TRICO FUSE MFG. CO., Milwaukee, Wis.

SAVES TIME
Protects Fingers

PAINE TOGGLE AND BOLT CLAMP

FREE With Every Box Of PAINE Toggle Bolts

LOOK For This Clamp and read instructions card attached. Clamp will cut toggle bolt installation time one-half and permit use of screw driver to tighten bolt.



USE PAINE TOGGLE BOLTS FOR FASTENINGS to Lath and Plaster, Hollow Tile, Sheet Rock and Insulation Boards.

THE PAINE CO., 2983 Carroll Ave., Chicago

Pacific Coast Representative: PAUL ATCHISON
2711 So. San Pedro, Los Angeles, Calif.

★ PAINE ★
FASTENING and HANGING DEVICES

SHASTA GENERATOR GIVEN TEST RUN AT COULEE

First of the two 75,000-kw. Shasta generators transferred to Grand Coulee power house on the Columbia River, was given its test run last month and is about ready for commercial production. The unit is known as Shasta L-7. A companion unit, Shasta L-8, is now in process of installation.

The two machines were completed and in storage awaiting installation at Shasta Dam, when the WPB ordered their transfer to Coulee last summer because there they could begin power production more than a year earlier. Because of different design features, it was necessary to utilize three of the standard Grand Coulee turbine pits for the installation of the two Shasta units.

G-E Technicians Get Awards for Repair Job

Awarding of 58 special Navy "E" pins to General Electric technicians who repaired electrical equipment on the battleships *California* and *West Virginia* at Pearl Harbor brought to light a spectacular electrical reconditioning job. The men, gathered from all parts of the U. S. by plane, train and boat, repaired propulsion equipment of the two boats, both of which had been damaged so severely in the Japanese Dec. 7, 1941 attack. that they settled to the bottom.

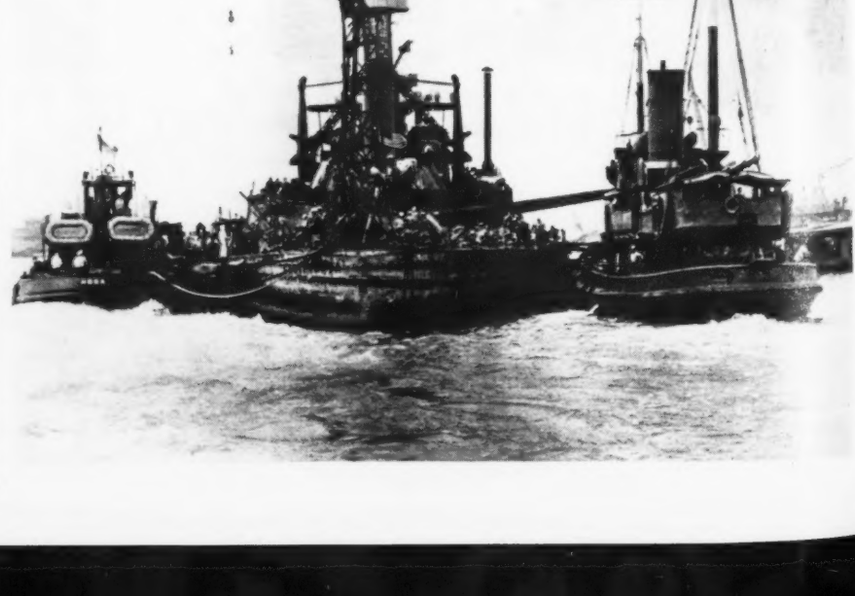
It was the first time that equipment of this type and size had ever been repaired under such conditions. The motors were covered by thick oil and muck. Some were corroded by salt water. Because apparatus was deep in each ship, everything taken in or out had to be carried by men walking single file on narrow companionways through four decks.

Working space was cramped and techniques for repair had to be improvised. On the 12-ft. diameter motors, it was necessary to stack the laminations and press them in place with hydraulic jacks while the machines were in the normal horizontal operating position.

The crews, which worked three shifts, seven days a week were directed by Charles Edwin Wilson, veteran G-E engineer. Four were from San Francisco and five were borrowed from the Bureau of Power & Light in Los Angeles.

● FORTY FEDERAL, state and local agencies are cooperating in Central Valley Project studies being conducted by the USBR and it is hoped that other groups will be enlisted, it was announced last month by Commissioner John C. Page. Covering 24 basic problems, the studies seek to determine how the project can contribute most to the war and to postwar adjustments, and how it can best be fitted into California's established economy.

Battleship U.S.S. California, 32,600-ton turbo-electric driven ship, being towed to drydock after being raised by use of cofferdams from shallow resting place in Pearl Harbor. She was sunk during Japanese December 7 attack



PRIORITIES SLOW WORK ON STEEL PLANT

Construction of the $150,000,000 Geneva steel works near Provo, Utah, is progressing as satisfactorily as can be expected in the face of difficult priority conditions, according to officials of the Columbia Steel Co. It is now estimated that the plant will not be in operation before the end of 1943 despite previous mid-summer estimates.

The 750,000-ton plant, which will be the largest integrated steel mill west of the Mississippi, is being built by Columbia for the Defense Plant Corp. It is designed to help supply war shipbuilding needs of the Pacific Coast. Raw materials, including coal, iron ore, limestone, etc., to feed the 252 coking ovens, three pig iron furnaces and nine steel furnaces will all be obtained in Utah from sources close to the mine. In addition to plate and structural steel, the mill will supply considerable quantities of tar, gas, ammonium sulphate and motor fuel as by-products of the coke conversion process.

Storms Improve Stream Flow in Western States

Unusual storms and floods along the Pacific Coast in Oregon and California, exceptionally large run off in Nevada and slight improvement of stream flow in the Rocky Mountain area were reported for January in the Department of Interior Water Resources Review.

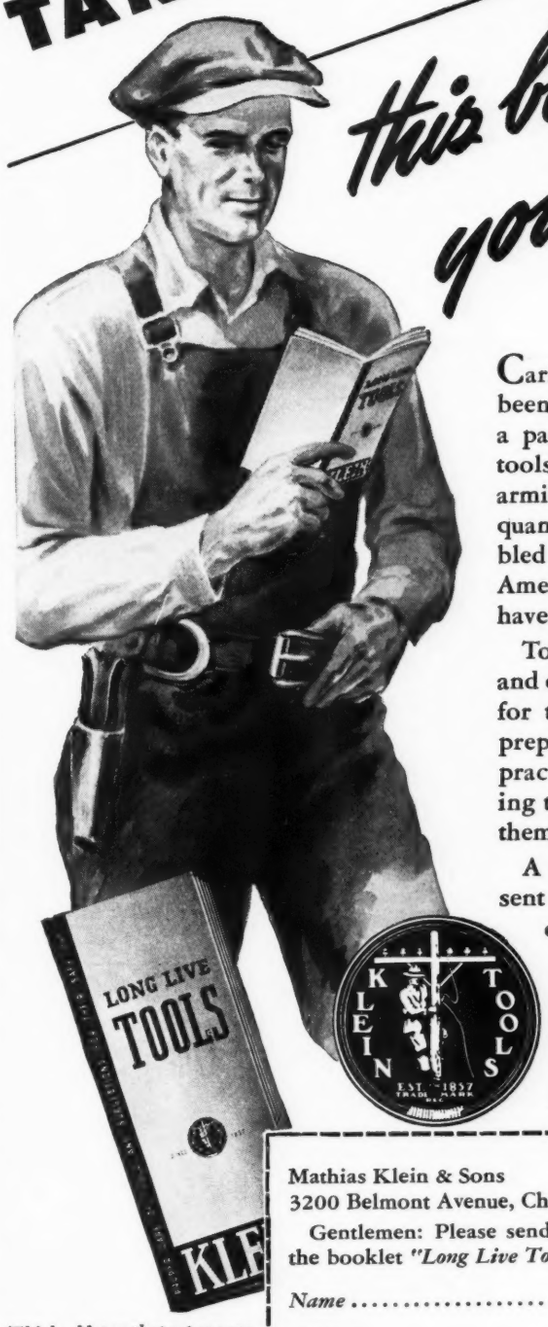
A heavy storm along the coast Jan. 20-22 brought flood conditions in Oregon and in northern and southern California. Flood stages at certain points in California were the highest since 1928 and on the North Fork of the American River exceeded any year since the beginning of record in 1911. Total run off of the Santa Ana River in southern California was the fifth highest since records began in 1903.

Effect of the Pacific Coast storm was felt almost 500 miles inland, from Idaho, Nevada to Arizona, providing the first precipitation of any consequence in Arizona since September. January stream flow averaged about 140% of normal in the intermountain region as compared with about 100% in December.

In Idaho on Jan. 23 high peaks of short duration occurred on streams in the vicinity of Arco and Idaho Falls and tributaries of Snake River in Owyhee County. Montana, especially in the northern part, was cold and wet during the month; there was a net increase in snow cover and stream flow generally receded.

IT PAYS TO TAKE CARE OF TOOLS—

this book tells you how



Caring for tools has always been good business—now it is a patriotic duty. For it takes tools to win a war. Mechanized armies need hand tools in such quantities that even with doubled and redoubled production, American tool manufacturers have few left for use at home.

To assist linemen, electricians and other who use tools to care for their equipment, we have prepared a handbook full of practical suggestions on making tools last longer—or using them with greater safety.

A copy of this book will be sent anyone interested. It is our contribution to help lengthen the life of tools and equipment.

DISTRIBUTED THROUGH JOBBERS
Foreign Distributors: International Standard Electric Corp., New York

Since 1857

This booklet on the proper care of tools and suggestions for their safe use will be sent on request to anyone interested. Mail the coupon.

Mathias Klein & Sons
3200 Belmont Avenue, Chicago, Illinois

Gentlemen: Please send me without charge a copy of the booklet *"Long Live Tools."*

Name .....

Address .....

City ..... *State* .....

Mathias KLEIN & Sons
Established 1857 — Chicago, Ill., U.S.A.
3200 BELMONT AVENUE, CHICAGO

MANUFACTURERS OF LINEMEN'S TOOLS AND EQUIPMENT

PEOPLE
made this news

Beckett Named Treasurer of Pacific Gas & Electric

E. J. Beckett, financial assistant to President J. B. Black of Pacific Gas and Electric Co., has been appointed treasurer of the utility, according to a recent announcement. Beckett came with PG and E in 1915 as secretary to the late A. F. Hockenbeamer, who at that time was vice-president and treasurer of the company. In 1920 he was made assistant treasurer.

When Hockenbeamer became president, Beckett was made his financial assistant, a position he has occupied continuously since that time, serving in the same capacity for President Black.

D. H. Foote who has acted as secretary-treasurer for the past 15 years will continue in his capacity as vice-president and secretary. Foote is also a director.

W. R. Frampton Retires From Edison Company

W. R. Frampton, manager of the shop and test division of Southern California Edison Co., retired recently after 37 years of service with the company. L. H. Beebe, Frampton's assistant and veteran of 25 years of Edison service, succeeds him as superintendent of the division.

Surprise farewell ceremonies on the day of Frampton's retirement were highlighted by the presentation by H. W. Tice, manager of operation, of a silver coffee and tea service from the group.

Frampton joined the Edison Co. as a testman on July 12, 1905. With the exception of about two years in distribution work, he has served in various capacities in the test division since. He was appointed superintendent of the division in 1914, and manager of the combined shop and test division in 1928.

The modern watthour meter and its related testing facilities as incorporated in the Edison system embody many of the principles of application and use conceived and promoted by Frampton, especially the new sequence outdoor meter. In this arrangement, the meter is installed ahead of fuses and switches, expediting meter testing and meter reading without interruption of service.

● E. H. Adams, vice-president of the B. C. Electric Railway Co. Ltd., has received word that his eldest son, Lieut. Ernest Adams, arrived safely in England with the Canadian Corps of Signals. Lieut. Adams was formerly on the engineering staff of the Canadian General Electric Co. He was in training in Canada for some time before leaving for overseas.

● Thomas J. Straub, general attorney for the Pacific Gas and Electric Co., has been appointed a member of the regional War Labor Board for California, Nevada and Arizona, as an employer representative.

● Charles A. Sonegar, electrical contractor in San Francisco for many years, died Feb. 6 at his home in San Bruno. He was 62, a native of Hungary and had been a member of the San Francisco Electrical Contractors Assn. for many years.

Kenneth Hampton "Drafted" By OPA at Fresno

Kenneth L. Hampton, one of the West's best informed men on merchandising, assistant manager of the Valley Electrical Supply Co., Fresno, for the past 20 years, was "drafted" to become manager of the newly enlarged Office of Price Administration for the Central California District embracing Fresno, Kings, Madera, Mariposa, Merced and Tulare counties. He assumed his duties at the Patterson Building headquarters Feb. 1.

Author of the series of articles on merchandising fundamentals, published in Electrical West's *Business Guide* during 1942, Hampton was also president of Suppliers, Inc. and has held many positions in trade groups. He has been chairman of Fresno County Consumers Interest Council, member of the Fresno County Agricultural Manpower Commission, a director of the Credit Managers Assn. of Northern and Southern California and was donor of the "Hampton Award," given annually to outstanding members of the Fresno Junior Chamber of Commerce. He also acted as secretary of the Electric and Gas Appliance Societies in Fresno and headed up the dealer cooperative activities of the Valley Electrical Supply Co. on behalf of the Pacific Gas and Electric Co., San Joaquin Division, as right-hand man of H. H. "Kelly" Courtright, Valley's president and manager.

● T. C. Clarke, district manager of Northern Electric Co., Vancouver, B. C., has been elected by acclamation as vice-president of the Vancouver Board of Trade.

Consolidation of all engineering, production, transmission, distribution and service activities into one department under R. B. King, general superintendent, was announced recently by President C. J. Strike of Idaho Power Co. Below are heads of this new electrical department: H. L. Senger, chief engineer, in charge of construction; King; B. C. Russell, assistant general superintendent; H. M. Jones, electrical superintendent.

Answer to "Who Am I?"

See Page 63

M. W. Phillips

● CHARLES D. GIBSON, author of the school lighting article *Teaching Children, Not Subject Matter,* January 1942, p. 53, then superintendent of Mountain View School District, El Monte, Calif., is now with the State Department of Education on special assignment involving planning of school programs and facilities. He is a member of IES, Southern California Section.

● HARRY D. BYERS last month was named treasury manager for Westinghouse Electric & Mfg. Co.'s Pacific Coast district. His headquarters will remain in San Francisco, where he has for the past four years served as treasury department representative. Byers joined Westinghouse in 1923 and has been in the treasury department since 1928.

● RICHARD W. FAVILLE, until recently manager of commercial and industrial sales for Northwestern Electric Co., has accepted a position as assistant to the vice-president of the M & M Plywood Corp. at Portland. D. O. Bergey was appointed Northwestern commercial and industrial sales manager following Faville's resignation.

● PRESTON, UTAH, lost two radio and appliance dealers to the Army when THOMAS DOYLE, manager of the Gamble's store, and ORVILL CHATTERTON, manager of Reed's Riteway store, were sent to San Francisco Junior College for a special radio training course for the Army.

● WILLIAM C. BRUMFIELD, founder of the Brumfield Electric Sign Co., San Francisco, father of both W. A. and Edward Brumfield, died Feb. 10 in San Francisco.

Drawing with all our might...

We are proud that WILBUR B. DRIVER CO. special alloys have so many vital war applications and of the part they are playing toward the final complete strangling of the "Unholy Three".

Perhaps we can help you make your product do its part more effectively or get on the job more quickly. Consult us for your requirements.

ELECTRICAL SPECIALTY COMPANY

Pacific Coast Representative

LOS ANGELES 418 East 3rd St. | SAN FRANCISCO 316—11th St. | SEATTLE 562 First Ave., So.

OUR MEN NEED ★ BOOKS ★

SEND ALL YOU CAN SPARE

That book you've enjoyed—pass it along to a man in uniform. Leave it at the nearest collection center or public library for the 1943 VICTORY BOOK CAMPAIGN.

ALL the strength and durability inherent in steel are combined---with definite economies---in *Crapo* Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous *Crapo* Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of *Crapo* Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

This Sherman Lug Is Made to Handle the Heavy Loads

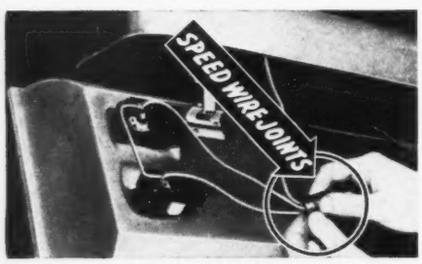
Here is a heavy duty wrought copper lug with the strength, weight and construction to do the hard jobs — handle big loads. Precision made, free from defects, with FLAT contact surfaces. For transformers, circuit breakers and other heavy duty electrical equipment.

H.B. Sherman Mfg. Co.
Battle Creek, Mich.

Specify Sherman

- Wrought Terminals
- Ground Clamps
- Solderless Lugs
- Fixture Connectors

Sherman *Heavy Duty Lugs*



Recent WPB Ruling
DRASTICALLY RESTRICTS SOLDER FOR WIRE JOINTS!

NO RESTRICTIONS

ON IDEAL Wire-Nuts

Solderless, Tapeless Wire Connectors

Solder-and-tape joints are **prohibited** where another product meeting electrical requirements can be used. IDEAL "Wire-Nuts" meet every requirement for the "other product". "Wire-Nuts" use No Critical Materials — Quickly Applied, Inspected, OK'd. Not a substitute but a **Better Way** of making wire joints!

(SAVE CRITICAL MATERIALS)
IDEAL "Wire-Nuts" use no Lead, Tin or Rubber as required for solder-and-tape joints and contain no copper or copper alloys. Consequently they are unrestricted and immediately available.

STRIP WIRES—SCREW ON—That's All!
Easier, Quicker to use. Applied **cold.** Think of the time-saving that means when multiplied by many thousands of wire joints! Rush war-plant jobs can be finished faster; yet you make a neater, more craftsman-like job, better electrically, stronger mechanically!
SIZES FOR EVERY JOB. Fully Approved. Listed by Underwriters' Laboratories, Inc. Millions in Use. Write for FREE SAMPLES.

Immediately Available

IDEAL COMMUTATOR DRESSER COMPANY
WEST COAST WAREHOUSE STOCKS:
Strieby & Barton, Ltd., 912½ E. 3rd St., Los Angeles, Cal.
F. M. Nicholas Co., 1123 Harrison St., San Francisco, Cal.
L. S. Foley, 1233 N. W. 12th Avenue, Portland, Oregon
Robinson Sales Co., 3215 Western Avenue, Seattle, Wash.

TRADE *notes*

Thermador Receives "E" Award at Los Angeles

"Your record of practical accomplishment is high, your production effort outstanding, and you have good reason for pride in both," wrote James Forrestal, under secretary of the Navy, in announcing to H. H. Fogwell, president, and William E. Cranston, Jr., vice-president and general manager, that Thermador Electrical Mfg. Co., Los Angeles, had been conferred the Army-Navy "E" Award for outstanding production of war materials.

With appropriately simple ceremonies the award was officially made to the employees of the plant Jan. 27 by Rear Admiral J. R. Defrees, USN (Retired), inspector of naval material for Los Angeles district. In a short address to the employees and guests Rear Admiral Defrees told of the Navy's tradition in respect to the "E" pennant, a reward for ships and men who surpassed in gunnery and engineering. He then reviewed the Nation's need to speed its war production from a standing start to surpass that of the enemy.

"You here in the Thermador Electrical Mfg. Co. are a fine example of the conversion from peacetime production to the production of vital necessities of war. To do this it was necessary for you to build a new plant over the old one—and this was accomplished without losing a day of work," he said.

Guests were first welcomed by Vice-president Cranston to open the ceremonies. Then Clyde E. Houston, vice-president and general manager, Southern California Edison Co. was made master of ceremonies. The color guard of the Navy raised the American Flag. Lt. Commander Corydon M. Wassell (M.C.), USNR, led in a pledge of allegiance. Commander J. C. Arnold, USN (Retired), told why *Your Navy Needs Production.* The principal address and presentation of the production flag was then made by Rear Admiral Defrees, and accepted by Harry H. Fogwell, president of Thermador.

Presentation of token lapel pins, such as will be worn by all employees of the company, were then made to Mrs. L. Fitzwilliam and Ira F. Johnson on behalf of their fellow employees by Lt. Col. H. H. Lawson, USA. Acceptance of the award for the employees was made by Charles Miller. With music from the United States Coast Guard Band, directed by Chief Bandmaster Rudy Vallee, the ceremonies closed.

This Western manufacturer of electric water heaters, fan-type electric air heaters, electric ranges, bathroom heaters and more recently of transformers is now devoting 100% of its efforts to war production. From its personnel 136 had joined the armed forces at the time of the award.

Taken during presentation of the Army-Navy "E" to Thermador Electric Mfg. Co., this picture shows (from left) H. H. Fogwell, company president; Lt. Col. H. H. Lawson, USA; Rear Adm. J. R. Defrees; Com. J. C. Arnold

Capt. Stanley M. Haight, commanding officer at Naval Net Depot at Tiburon, presenting Army-Navy "E" to W. W. Glosser, vice-president of Hubbard Lt. Comdr. L. L. Lovett, Twelfth Naval District, stands in the background

Army-Navy "E" Awarded to Hubbard and Co.

Outstanding achievement and excellence of production of vital war materials brought the coveted Army-Navy "E" award to the Emeryville, Calif., plant of Hubbard and Co. at the end of January. Capt. S. M. Haight, U.S. N., commanding officer of the Naval Net Depot, at Tiburon, presented the citation and flag to Hubbard Pacific Coast Vice-President W. W. Glosser. Lieut. Col. Wilbur Chamberlain, Signal Supply Officer, Overseas Division, U.S.A., awarded the pins to Hubbard employees represented by Richard Thurston.

In making the award Capt. Haight traced the development and application of naval nets as protective devices and emphasized the importance of this type of equipment in the present war with the ever-present submarine menace. In accepting the award Glosser pledged continuing and increased efforts of the employees and management so long as the war required it. He stated that although the award was made on the basis of production of material for the Navy, much standard pole line hardware and Pierce specialties were being supplied to the various branches of the Army.

The ceremonies were broadcast over Oakland station KLX. R. E. Fisher, Pacific Gas and Electric vice-president, acted as chairman.

Chamblin Moves Business to Larger Quarters

Clock and appliance repairs once just a minor part of the business of California Electrical Construction Co., San Francisco, has grown to such proportions that Clyde L. Chamblin, proprietor, had to find larger quarters. Accordingly, he moved from 639 Mission St. in the Rialto Bldg., where his shop has been for almost 10 years, to the corner of Mission and Fremont Sts. facing the East Bay Terminal. Expanded floor space on the main floor and a mezzanine permit the installation of facilities to handle the repair of appliances and clocks; while the large basement gives room for the contracting materials used in the construction end of the business.

Ropes, Seattle Firm, to Represent Kortick

Kortick Mfg. Co. of San Francisco has announced the appointment of Ropes, Inc., 538 First Avenue, S., Seattle, as exclusive distributors for the State of Washington and Territory of Alaska. Kortick pioneered the production of pole line hardware and specialties on the Pacific Coast in 1902.

Electrical distribution material lines of Ropes are in the hands of M. T. Burkland and W. B. "Bill" Davidson. Burkland is well qualified by his years of successful business with similar lines, and Davidson, an electrical construction engineer, has had more than 25 years' field and office experience in electrical and telephone line design, erection and maintenance.

A complete line of Kortick items is carried in Ropes' Seattle warehouse and prompt service on engineering problems, orders or inquiries is offered.

Moves

Good Housekeeping Shop in Reno moved from 136 Sierra to 101 Sycamore Way.

Wuelker Lighting Corp. has moved from 151 Seventh St. to 21 South Market St., San Francisco.

Mailway Banking
Can Help Your Business

Any service that saves you time and trouble helps your business. Mailway Banking does just that. It enables you to handle most of your banking right in your office, store or home, day or night whenever convenient. Our Mailway envelopes and forms make this service especially easy and safe.

Write today for information.

CROCKER FIRST NATIONAL BANK
OF SAN FRANCISCO
California's Oldest National Bank
Member Federal Deposit Insurance Corporation
ONE MONTGOMERY STREET

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420 Market St. San Francisco, Calif.
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Tree Trimming Equipment

Burndy Engineering Co.
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T. J. Cope, Inc.
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Herman D. Steel
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Kellems Co.
Cable Grips for Pulling and Permanent Support.

Minerallac Electric Co.
Insulating Compound, Clips, Hangers and Statiscopes

Schweitzer & Conrad
Fuses and Protective Devices

Specialty Device
Cone Anchors, Guy Guards and Earth Augers

The States Company
Test Blocks and Meter Testing Equipment

R. Thomas & Sons Co.
Pin-type and Suspension Insulators

Electroline-Fiege
Wire Rope Fittings

G.C.A.

Lamp Replacers
Lamp Base Removers
Cartridge Fuse Tongs
Switch Hooks

Send for Catalogue

We have been making safety tools for 26 years

THE G. C. A. Manufacturing Co.
Pittsfield, Mass.

TORK CLOCKS

THE POPULAR TIME SWITCH LINE KNOWN EVERYWHERE

NOW—lower prices and higher capacities

There is a Tork Clock for every regular switching job; 60 minute, 4 hour or daily cycles.

Bulletins on request

THE TORK CLOCK CO., Inc.
MOUNT VERNON, N. Y.

Western Representatives:

A. R. Slimmon, 445 E. 3rd St., Los Angeles
Geo. H. Curtiss, 540 McAllister St., S. F.
H. M. Sayers, 1101 Eastlake Ave., Seattle
Stevens Sales Co., 41 P.O. Place, Salt Lake City
Felix Simon, P. O. Box 614 . . . . . Denver
H. Geo. Shefler, P. O. Box 1587 . . . Phoenix

Pictured at the Los Angeles conference of General Electric and Graybar officials are (left to right): Harry Harper, Graybar; Kurt Steindorf, G-E; L. U. Murray, Graybar-Western Electric department, G-E; H. P. Litchfield, Graybar; Ed. M. Ellis, G-E; S. E. Gates, G-E; and W. E. Guy, Graybar Similar executive conferences were held in seven other Western cities

Graybar-G-E Hold Meetings Throughout the West

For about 30 years Graybar Electric Co. has had a contract with General Electric Co. to sell the latter's power apparatus through its branch houses. To review that contract and renew a pledge of cooperation between the two companies a series of meetings was held through the West during the past month. H. P. Litchfield, apparatus sales manager of Graybar, New York City, and L. U. Murray, manager of the Graybar-Western Electric department of General Electric Co., Schenectady, accompanied by General Electric executives in the industrial department, met with Graybar sales forces at Phoenix, San Diego, Los Angeles, San Francisco, Spokane, Seattle and Portland.

The Los Angeles meeting was typical. It was presided over by Harry Harper, Pacific district manager, Graybar Co., and S. E. Gates, district manager, General Electric Co., of Los Angeles. Talks were also given by Kurt Steindorf, manager industrial department, San Francisco, Ed M. Ellis, manager industrial department, Los Angeles, Walter T. Scott of the industrial department, all of G-E, and W. E. Guy, sales manager, Graybar, Los Angeles. A special speaker was F. P. Doherty, newly elected president of the Los Angeles Chamber of Commerce, who gave a plain spoken talk on the necessity for maintaining the American way of life despite the increasing regimentation brought on by war.

TRADE MARK REG. U.S. PAT. OFF.

Nichrome

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Stocked for the Coast Trade at

SAN FRANCISCO
235-241 San Bruno Ave.

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449 South San Pedro St.

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2122 Fourth Ave.

By

ANGUS-CAMPBELL, INC.

● S. E. "STEVE" GAMBLE recently became associated with Oliver B. Lyman in sales engineering work in the San Francisco Bay Area. Gamble was with Westinghouse for about 20 years. Established in 1922, Oliver B. Lyman represents I-T-E Circuit Breaker Co.; R. E. Uptegraff Mfg. Co.; Koppers Co., Bartlett Hayward division; Permutit Co.; and Atwood & Morrill.

ECONOMICAL

Jeffries Transformers

Reasonable in Price
Reliable in Performance

Jeffries large transformers are priced reasonably—and you can save their first cost in a short time by minimizing current losses. When you use a Jeffries transformer, you can provide voltage change at the point desired, without prohibitive expense.

We supply all types and sizes. If not in stock, we build to order in a hurry—a week to 10 days.

Write today for catalog

JEFFRIES TRANSFORMER COMPANY
1710 E. 57th St. Los Angeles, Calif.

SMOOT-HOLMAN

SMOOT-HOLMAN COMPANY
SIGHT-CRAFT
INGLEWOOD, CALIFORNIA

LUMINAIRES FLUORESCENTS
REFLECTORS FLOODLIGHTS

INDUSTRIAL AND COMMERCIAL LIGHTING EQUIPMENT

HOME OFFICE AND FACTORY
INGLEWOOD, CALIFORNIA

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460 7th Street, San Francisco, Calif.

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FRED ZAUGG
907 N.W. Irving St.
Portland, Ore.

COAST SALES CO.
307 Main Street
Seattle, Wash.

STEVENS SALES CO.
41 Post Office Place Salt Lake City, Utah

Los Angeles Winner in Wesco Service Contest

Promptness in the handling of service complaints properly was made the basis of a contest between various branch houses of the Westinghouse Electric Supply Co., in which the service department of Wesco, Los Angeles, was one of the outstanding winners. Other Western houses also placed well in their respective contests.

The contest was based on the elapsed time between the moment that a complaint reached the factory and the time that the distributor in the field followed it up, saw that service was completed, and had an acknowledgment from the customer in writing that it was satisfactorily closed. Distributors were placed in various leagues with other distributors throughout the country on a comparable territorial size basis. Thus, the Los Angeles house competed against comparable distributors in Missouri, Pennsylvania, New York, Michigan, Kentucky. It won the trophy for this league and J. H. McCarty, service manager, Los Angeles, was presented the trophy by E. C. Watts, district service supervisor of the Westinghouse company.

The Seattle Wesco house ended in a tie with the Texas distributor. The Spokane house tied that of Phoenix and the Electric Supplies Distributing Co., Westinghouse distributor in San Diego. In still another league the Butte house tied those of Kansas, New York, and Kentucky.

● RICKETTS-SEWELL ELECTRIC LTD., 429 West Pender Street, Vancouver, B. C., have been awarded the subcontract for the wiring work in connection with the $18,000 reconstruction program of the Vancouver Supply Co. Ltd., following its recent fire.

● W. B. "BILL" KENADY has been appointed sales, field and service engineer for Kortick Mfg. Co. in northern and central California.

● FRANK W. LOOMIS, for some time with Sylvania Pacific Co., Los Angeles, has now become secretary of the Civil Service Assn., of Los Angeles.

● KEESE ENGINEERING CO. has moved to 420 Market St. in San Francisco. The former location at 557 Market has been taken over by the Navy.

● JAMES J. BEITLER has been named Pacific Coast district auditor for Westinghouse Electric & Mfg. Co. with headquarters at Emeryville, Calif.

● NATIONAL ELECTRICAL WHOLESALERS ASSN. has moved into a new office at 500 Fifth Ave., New York.

HELWIG SPEER

HELWIG COMPANY
Carbon Products

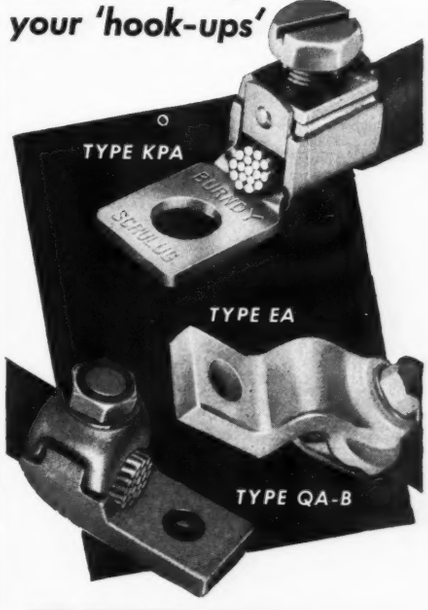
D. E. Lamore
Ninth & Harrison Streets
Oakland, California

Richardson Electric Supply
166 Jackson Street
Seattle, Washington

C. E. Riggs
324 N. Broadway
Portland, Oregon

F. S. Fletcher
225 W. Pico Blvd.
Los Angeles, Calif.

TIME
is a 'critical material'
BURNDY LUGS
will 'speed up'
your 'hook-ups'



BURNDY
107 EASTERN BLVD., NEW YORK, N. Y.

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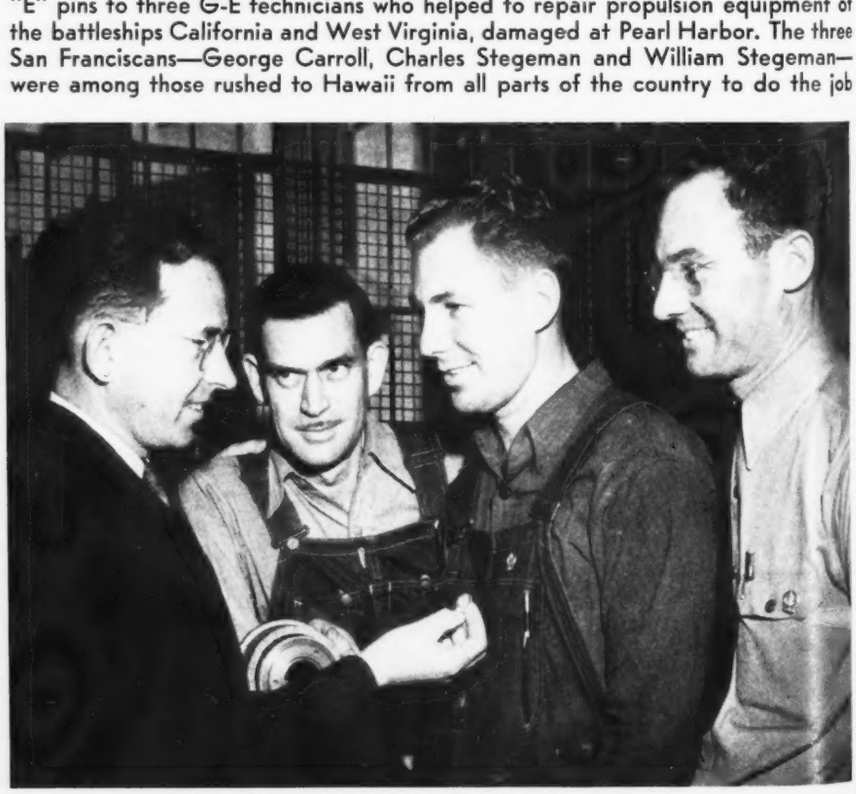
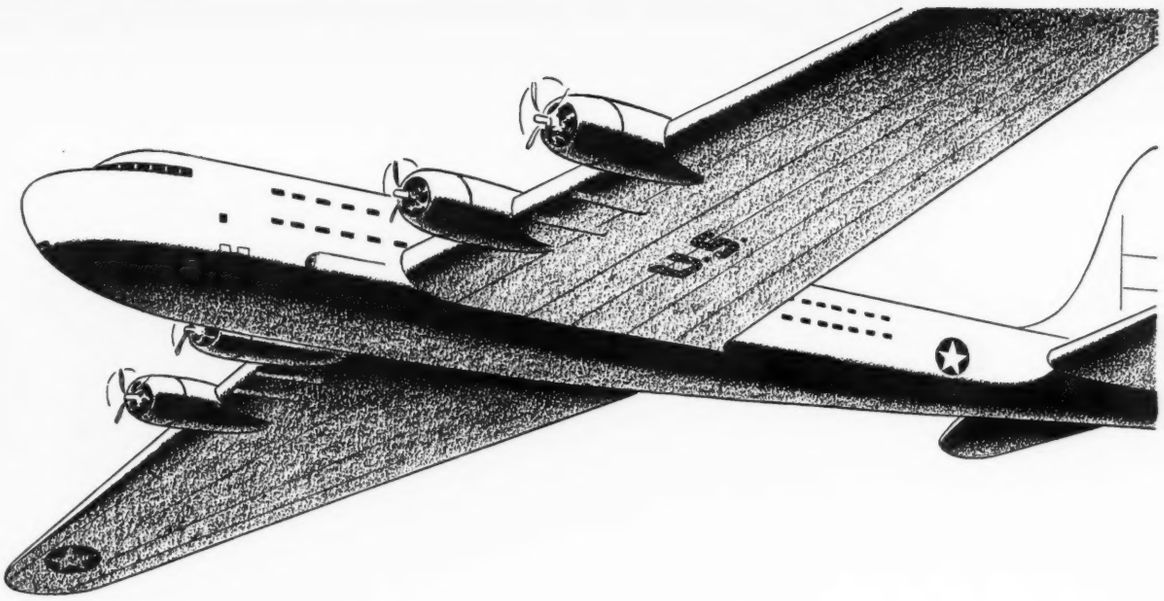
PROFILES *of the month*

Like a meeting of the clan it was when S. W. Scott, manager Graybar power apparatus dept., Los Angeles, met Walter T. Scott, industrial dept., General Electric Co. at the recent gathering of Graybar and G-E industrial power apparatus executives to reaffirm a 30-year contract for distribution.

Pictured below at the AIEE technical meeting in New York last month are left to right. A. C. Monteith, Westinghouse, L. M. Robertson and H. F. Gidlund, Public Service Co. of Colorado.

G. E. Koernig (left below), General Electric service shop manager, awards Navy "E" pins to three G-E technicians who helped to repair propulsion equipment of the battleships California and West Virginia, damaged at Pearl Harbor. The three San Franciscans—George Carroll, Charles Stegeman and William Stegeman—were among those rushed to Hawaii from all parts of the country to do the job





It shall be... { A TOTAL VICTORY / A LASTING PEACE

Our boys are striking telling blows these days on many battle fronts. They will strike harder and oftener throughout 1943. And this will be because you with your Bond Dollars are giving them the weapons to fight with. Every ship, plane, tank, gun, rolling off the American line of production, is speeding the day of total victory.

Knowing this, you are willing to sacrifice, to forget luxuries, even to do without many things you have looked upon as living necessities. It is the boys on the firing line who must endure the real hardships. And that our country shall be safe and that we shall win through to a lasting peace, we at home must do our share in the only way open to us—and that is by making sure that the world's best munitions of war are in the hands of the world's best warriors.

Buying War Bonds is the patriotic thing to do. It is also the smart thing to do. It is a guarantee of America's future. For when the boys come home those bonds will be ready to find their way into the channels of free American enterprise—to build homes, establish farms, equip shops, and help our nation move into the blessed activities of Peace.

Buy War Bonds regularly and according to plan. Increase the percentage of your income you are investing in them. Help to build up the grand total of America's Nest Egg.

P·G·and E·
PACIFIC GAS AND ELECTRIC COMPANY

TO SPEED THE DAY OF HOMECOMING BUY WAR BONDS & STAMPS

NO RESTRICTIONS ON FORESIGHT!

Construction of homes is restricted now, but it isn't difficult to foresee that thousands of new homes will be built after the war. They will represent the greatest potential market electrical contractors and appliance dealers ever have had! To the electrical industry, a home must have adequate wiring to be complete. Every home with plenty of convenience outlets will offer better opportunities for selling the many new appliances that will be available after industry goes back to peace-time production.

It's good business to start laying the foundations now for tomorrow's selling. Talk "adequate wiring" in your conversations with builders and contractors, architects, home owners and people who are planning to build new homes after the war. Tell them the advantages of having plenty of electrical outlets . . . and tell them how adequate wiring keeps a home modern for years. For more information about adequate wiring, write to

PACIFIC COAST ELECTRICAL ASSOCIATION

601 WEST 5TH STREET, LOS ANGELES • 447 SUTTER STREET, SAN FRANCISCO